

AN APPROACH TO CURRICULUM GRACE

A thesis submitted in partial fulfilment of the requirements for the
Degree
of Doctor of Philosophy in Education
in the University of Canterbury

by

Raymond M. Genet

University of Canterbury

2016



Drawn from Nature and Published by John J. Audubon, F.R.S. & L.S.

Engraved, Printed & Coloured by R. Smith.

Red-winged blackbird formerly known as the Red-winged starling or Marsh blackbird from *The Birds of America* (1827-1828) by John James Audubon

After a while she looks up and says, "What did you see?"

"There was a whole flock of red-winged blackbirds. They rose up suddenly when we went by."

"Oh."

"I was happy to see them again. They tie things together, thoughts and such. You know?"

She thinks for a while and then, with the trees behind her a deep green, she smiles. She understands a peculiar language which has nothing to do with what you are saying. A daughter.

"Yes," she says. "They're beautiful."

"Watch for them," I say.

"All right."

From *Zen and the Art of Motorcycle Maintenance* by Robert Pirsig (1974, p.9)

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABSTRACT	1
CHAPTER 1 INTRODUCTION	3
Thesis Rationale and Thesis Topic	4
My Experience and Background	7
Personal Teaching Dilemma - Developing Socratic Inquiry and Problem Posing Education	8
Background to the Teaching of Consilience	12
Research Questions.....	13
Choice of Research Design	14
Choice of School	14
French Language Teaching in New Zealand and Consilience	17
The New Zealand Curriculum and Assessment Context.....	17
Thesis Plan	21
CHAPTER 2 CONSILIENCE, CONTROVERSY, COHERENCE & GRACE.....	24
Etymology and Historic Roots of Consilience	25
E.O. Wilson's Conceptualisation of Consilience	27
Criticism of E.O. Wilson's <i>Sociobiology</i> and <i>Consilience</i>	29
Criticisms Relating to Sociobiology	30
Criticisms Relating to Wilson's (1998) Conception of Consilience	33
Détente.....	33
Consilience as Congruence	36
Consilience and Grace.....	36
Summary	38
CHAPTER 3 TOWARDS A THEORETICAL FRAMEWORK	41
The Adaptive Change Cycle (ACC).....	42
Conservation or K-Phase	43
Release or Ω -Phase.....	44
Exploitation (r)	50
The Three Dimensions of Adaptive Change Cycle	51
Summary	57

CHAPTER 4 METHODS	60
Education Research Ethics	62
Case Study Definition, Aims and Methodology	63
Case Study Participant Relationships	64
Single Case Analysis	67
The Unit of Work for School #1.	67
Communicative Language Teaching.	68
Task Based Language Teaching	69
Content Based Instruction	69
Thematic Integrated Learning	72
Authenticity	73
The Lessons	80
Data Collection and Analysis	87
Supplementary Data for Triangulation	90
Learning Journals	93
Recording Devices.....	93
Supplementary Sources - Ensuring Internal Reliability of Evidence	93
Interviews and Conversation Analysis	94
Summary	96
CHAPTER 5 RESULTS	98
Section 1: Conservation Phase (K_1) - Pre-Disturbance: Extracts 1-8.	101
Extract 1.....	101
Extract 2.....	106
Extract 3.....	107
Extract 4.....	108
Extract 5.....	109
Extract 6.....	110
Extract 7.....	112
Extract 8.....	114
Section 2: Extract 9 - Collapse ($K \rightarrow \Omega$) - Student Critique of the Expert Story	116
Section 3: Reorganisation (α) Continued Student Critique of the Expert Story: Extracts 10-14	117
Extract 10.....	117

Extract 11.....	118
Extract 12.....	120
Extract 13.....	121
Extract 14.....	123
Section 4: Summary of Extracts 1-14 Lesson 1 – Conservation (K_1), Collapse (Ω), Re-organisation (α) and Renewal (r).....	124
Section 5: Renewal/Growth (r) – The Creation of an Original Idea: Extracts 15-18.....	126
Extract 15 – Lesson 6	126
Extract 16 – Lesson 7	127
Extract 17 – Lesson 8	128
Extract 18 – Lesson 8	130
Section 6: Arrival at Conservation (K_2) - Idea Refinement.....	132
Extract 19 – Lesson 8	132
Section 7: Conservation (K_2) – Idea Calcification and Senescence - Extracts 20-25	136
Extract 20 – Lesson 8	136
Extract 21 – Lesson 8	137
Extract 22– Lesson 8	138
Extract 23 – Lesson 9	139
Extract 24 – Lesson 11	142
Extract 25 - Self- Reported Questionnaire Data – Post Unit Questionnaire	143
Summary	144
Conservation (K_1) - Extracts 1-8	145
Collapse ($K \rightarrow \Omega$).....	146
Reorganisation (α)	146
Arrival at Renewal/Growth (r) – Student Evaluation of the Expert Story	147
Renewal (r) – The Creation of an Original Idea	147
Arrival at Conservation (K_2) - Idea Refinement.....	147
Conservation (K_2) – Idea Calcification and Senescence	148
Conclusions	148
CHAPTER 6 RESULTS 2	150
Lesson 3 Outline and Theory	152
Savannah Hypothesis and New Zealand Landscape Paintings	154
L5’s Response to the Savannah Hypothesis - Disturbance 1	155

L5 Jokes about the New Zealand Landscape and the Class Laughs - Disturbance 2.....	157
<i>100% Pure New Zealand</i> – Disturbance 3 - “oh! yeah.”	164
Sackur-Key Interview – Disturbance 4 - “Yeah eighty percent pure come here!”	166
L3 and L7 : « ...c’est que ce que nous voulons voir n’est pas la réalité. »	178
“The problem is what we want to see is not the reality.”	178
Summary	183
L5.....	183
L3 and L7.....	185
Summary of Chapters 5 and 6	186
 CHAPTER 7 DISCUSSION.....	 189
Research Question 2 – Enablers and Barriers	190
a) Students Were Not Given the Complete Story.....	190
b) Making Vertical and Horizontal Connections Explicit.....	191
c) Peer Interactions in the Target Language and Fluency	194
Research Question 3a – Evaluation of the Theoretical Framework.....	198
3a) To What Extent Can the Learning Experience Be Described Using Panarchy as a Theoretic Framework?.....	198
Panarchy and Transformational Learning Process after Stanger et al. (2013).....	202
Evaluation of the Metaphor	204
Methodological Limitations	205
Limitations of Data Collection and Analysis	205
Limitations of Conversation Analysis Transcription Conventions	206
Audio Recordings – No Visual Data	206
Summary	207
Enablers and Barriers.....	207
Evaluation of the ACC of Learning in Comparison to the Experiential Learning Cycle	209
Limitations.....	210
 CHAPTER 8 INSIGHTS	 211
Research Questions 3b	211
Self-Organising Holarchic Open Systems (SOHOs) after Kay (1999).....	213
The Classroom as a SOHO System – The Role of the Teacher and Researcher.....	216
Dissipative Structures	217

Self-Organisation.....	226
The Teaching and Learning of E.O.Wilson’s <i>Consilience</i> as a SOHO System	228
SOHO Systems and the Adaptive Change Cycle	230
Summary.....	232
An Ecological View of Evaluative Constructivism	234
Constructivism.....	235
<i>Potential</i> in the ACC and <i>Choice</i> in Conner’s Evaluative Constructivist Model	239
‘Engagement’	241
Potential in the ACC and Intentions in Conner’s Evaluative Constructivist Model	242
Connectedness in Relation to Engagement, Intentions and Choices.....	242
Resilience in Relation to Engagement, Intentions and Choice.....	243
Summary.....	244
The Three Dimensions of ACC and <i>The New Zealand Curriculum</i> Key Competencies..	245
Connectedness	245
Potential	247
Resilience.....	248
CHAPTER 9 THEORETICAL FRAMEWORK: INSIGHTS FROM ERNEST HEMINGWAY’S <i>BIG TWO-HEARTED RIVER</i>	251
Introduction	252
Fire Ecology and Teaching and Learning	254
Fishing Is a Metaphor for the Writing Process	256
Grasshoppers – Impermanence of Change and Adaptation	257
Hemingway and Cezanne.....	259
Technique 1: The Transformation of Empty Space by Creating Tension between Two or More Planes	261
Technique 2: Containment of the Tension between Planes.....	264
Technique 3: Omission – The Iceberg Technique	265
Holding Steady in the Swift Current and the Red Queen	268
Summary	269
CHAPTER 10 CONCLUSIONS	271
Contributions to Knowledge	271
Defining Consilience	272

A Forest Ecosystem as a Metaphor for Teaching and Learning.....	273
Insights	274
i) Consilience themes as means to break down discipline barriers at K-phase, opening up a portal between Learning Areas and providing an organisational template at α -phase to generate links between Learning Areas.....	274
ii) Consilience and Coherence for the teacher-researcher	274
iii) Panarchy as a theoretical framework to describe the teaching and learning process and other learning theories	276
Insights for Future Research from the Application of Panarchy to Teaching and Learning.....	277
Insights for Further Refinement of the Panarchy of Teaching and Learning Metaphor ...	277
Teaching and Learning as a Self-organising Holarchic System (SOHO)	277
Evaluative Constructivism and Panarchy	278
NZC Key Competencies, Panarchy and Consilience	278
Insights from Ernest Hemingway's Short Story <i>Big Two-Hearted River</i>	279
The Principle of Coherence	279
An Approach to Curriculum Grace	280
ACKNOWLEDGEMENTS	282
BIBLIOGRAPHY	283
APPENDICES	340
Appendix 1: Unit of Work.....	341
Appendix 2: Selected Observational Notes & Teacher-Researcher Debrief Notes.....	405
Appendix 3: Ethics Documents.....	415
Appendix 4: Questionnaires.....	432
Appendix 5: Students Profiles.....	439
Appendix 6: Contribution to Lesson 9 from V. Burrows.....	447
Appendix 7: Glossary of Maori Terms.....	449
Appendix 8: Extracts for Chapter 5 Results (1).....	450
Appendix 9: Extracts for Chapter 6 Results (2).....	478

LIST OF FIGURES

Figure 2.1 The tree of life from Darwin’s (1859) <i>On the Origin of Species</i>	27
Figure 3.1 Holling’s model of adaptive change cycle (ACC)	42
Figure 3.2 Panarchical connections	46
Figure 3.3 Release or collapse to Reorganisation (Ω to α) period of the ACC	48
Figure 3.4 Three-dimensional model of the ACC	56
Figure 4.1 Case study conceptual framework	65
Figure 4.2 Rationale for Curriculum Coherence	79
Figure 4.3 Template of the ACC	90
Figure 5.1 Steps in L4’s learning in the form of a song entitled <i>La nature est vivante !</i>	100
Figure 6.1 L5’s learning from Lesson 3 to Lesson 12 expressed metaphorically as a Holling’s (2001) adaptive change cycle	182
Figure 7.1 Kolb and Kolb’s (2009) experiential learning cycle	199
Figure 7.2 Parallels between the ACC and the phases of Kolb and Kolb’s 2009 experiential learning cycle for student L5 in Lesson 3	200
Figure 7.3 The experiential learning spiral	201
Figure 7.4 The ACC as an iterated spiral	204
Figure 8.1 General spatial conceptual configuration of the SOHO system elements	216
Figure 8.2a Kay’s (1999 p. 19) original conceptual model of self-organising systems as dissipative structures	226
Figure 8.2b Kay’s (1999) original conceptual model of self-organising systems as dissipative structures adapted for The New Zealand Curriculum Context	227
Figure 8.3 Conceptual model of the role consilience plays in the generation of ideas in the classroom	229
Figure 8.4 Holling’s (2001) ACC interpreted as a SOHO after Kay (1999)	231
Figure 8.5 Relationship between learning intentions that is curriculum content, and then range of choices available to students to apprehend the learning intentions (after Conner, 2014)	238
Figure 8.6 Conner’s (2014) schema of interactions between intentions and choices on engagement in evaluative constructivism positioned into the Reorganisation phase of Holling’s (2001) ACC	239
Figure 9.1 <i>Cour de ferme</i> by Cézanne (1839) Musée d’Orsay, Paris	260
Figure 9.2 The arrangement of static and dynamic planes in Cezanne’s <i>Cour de ferme</i> modified from Hagemann (1979, pp. 93, 94 & 97)	262

LIST OF TABLES

Table 5.1 Pre-unit and Post-unit Work Questionnaire	134
Table 8.1 Summary of SOHO terms and the proposed metaphorical counterparts in teaching and learning	213

ABSTRACT

E.O.Wilson's notion of consilience is the interpretation of cultural expression and human behaviour as biological phenomena. In this thesis I have undertaken to use consilience as means to meet the requirements of Principle of Coherence in the Learning Area of Learning Languages in *The New Zealand Curriculum*. I did this through a problem posing approach and applied it to the classroom in the form of activities that have overlap with task based and integrative learning. I created a unit of work that was designed to incite students to consider and discuss E.O.Wilson's consilient view of aspects of human behaviour and culture as it pertains to the New Zealand environment in the target language of French. The evidence that the students had learned the subject content in a manner that used consilience to underpin the learning was a 2 minute French language podcast for a specialist website that caters for French travellers to New Zealand.

Twelve lessons were observed, recorded, and transcribed, and extracts transcribed and analysed using conversation analysis. I used an interpretive, naturalistic approach to make sense of specific conversations and how they contributed to students' learning. I focused on two students named Learner 4 (L4) and Learner 5 (L5). I traced the development of two of their ideas as evidenced through audio-recording and supported by observations, questionnaires, and teacher-researcher debrief notes.

In the analysis of student responses I used the adaptive change cycle (ACC), a model of forest ecosystem change adapted from Holling (2001) as a novel metaphorical frame to describe students' thinking. In this way, I used consilience in the sense of congruence. I proposed that this ecological model can be used to frame student learning. This I considered was a step towards the meeting the Principle of Coherence in *The New Zealand Curriculum*.

The connection of the curriculum through an evolutionary world view, engagement with the arts, and the perceptions of unifying natural patterns appear to resonate with Bateson's notion of "grace". This establishes coherence in the curriculum that I refer to as curriculum grace.

In applying the metaphor to the instances of learning of two students there were no negative analogies. Each extract could be coherently plotted on an ACC template. The ACC metaphor appears to provide a robust framework for the learning process.

The ecological model allowed the identification of instances of conceptual change as evidenced in system collapse points that are analogous to ecosystem collapse during disturbance events. These moments usher in periods of reorganisation, renewal, growth, and senescence. This thesis contributes to the ways in which we find those moments that indicate conceptual change and consequently the moments when teachers can evaluate learning progressions and could provide appropriate feedback.

Student responses to the unit of work suggest that even though they were not willing to maintain an unprepared discussion in French on the assigned tasks, they successfully generated innovative solutions that demonstrated reflection and these resulted in prosocial actions.

CHAPTER 1

INTRODUCTION

Consilience is the unification of knowledge (Wilson, E.O. 1998; Wilson, 2012; Slingerland & Collard, 2012). It is concerned with the empirical study of the arts as expressions of biological human nature (Wilson, E.O. 1998), the pursuit of overlapping patterns common to human social phenomena and those found in Nature which Wilson (2012) refers to as “congruence” (p. 1) and finally the free exchange of ideas between the arts and sciences for mutual insight and guidance, referred to as the “second wave of consilience” (Slingerland & Collard, 2012 p. 23; Slingerland, 2014).

In this thesis I explore the application of these forms of consilience to teaching and learning: first, in creating interdisciplinary connections between the arts, biology, and the study of the French language at a senior level in the New Zealand secondary school system. In this regard I consider the extent to which consilience can contribute to the fulfilment the “Principle of Coherence” in *The New Zealand Curriculum* of the New Zealand Ministry of Education (MoE) (see MoE, 2007, p. 7). Second, in exploring the possibility of monitoring student learning through a pattern of ecosystem change, I propose that engagement in these two undertakings, may constitute an approach to seeing the individual as the product of, and nested within the complex systems of co-evolution with the *other* Bateson (1972) called this state as “evolutionary wisdom” or “grace” (p. 108). That is, the participant may see themselves as “at one with the world” in which case it could be argued that they would exhibit key characteristics of Gardner’s (2008) ‘spiritual intelligence’ or which he preferred to call “existential intelligence” (p. 20) (see Chapter 3). Further, physicist and environmentalist Capra saw Bateson as a formative influence on his work on complex living

systems (Charlton, 2008). Bateson's notion of grace appears have much in common with Capra's notion of "ecological literacy" (see Capra and Luisi, 2014 p. 291; see Chapter 7).

In the context of teaching and learning I refer to this development as an approach to curriculum grace.

The aim of this opening chapter is to detail why and how this investigation took place. I begin with an explanation of the thesis rationale and a statement of the topic of my research.

I acknowledge that for many authors each researcher brings to their research experience that may influence many decisions regarding how they decide to approach their investigation and what they decide to study (Miles & Huberman 1984; Lincoln & Guba, 1985; Merriam, 1998; Kuhn, 1962/2012; Wilson, E.O.1998). To this end, in the next section I outline the teaching experience and background that has shaped my world view, as well as my approach to teaching and learning. From this point, I outline a personal teaching and learning dilemma that I have sought to resolve through this thesis. Next, I detail the education context in which this investigation took place. I detail the background of the teaching of consilience in the New Zealand context. I then present the three thesis questions. I explain how I sought to answer these questions and the reasons for choosing the research design. After this, I describe the school profile and the reasons I chose that school in which to conduct the field work aspect of the study. I then outline the nature of the consilience Unit of Work prepared for the students in the senior French class at the chosen school. Following on from this description, I give an overview of how a senior French language programme is organised in regards to *The New Zealand Curriculum* and the assessment regime in New Zealand secondary schools. In the last section of this first chapter I set out the thesis plan.

Thesis Rationale and Thesis Topic

It is widely believed that solving global environmental problems requires an interdisciplinary approach (Orr, 1992; Wilson, E.O. 1998, 2013, 2014b; see Staib, 2003; Graybill, Dooling, Shandas, Withey, Greve, & Simon, 2006; Porter & Rafols, 2009; Wilson E.O., & Hass, 2014). Global scholarship, however, is extremely diverse and fragmented into innumerable specialist disciplines. Those disciplines are divided into two broad categories of the sciences and the arts famously described in as "the two cultures" (Snow, 1959 p. 2). Occasional exchanges notwithstanding, the divide has changed the tertiary institution from being a

university to a “biversity” (Slingerland & Collard, 2012 p. 34). Notwithstanding the division and mutual suspicion (Snow, 1959; Wilson, E.O.1998; Pinker, 2002; Slingerland & Collard, 2012) it is likely that education in the future will see a blurring of curriculum boundaries (Gilbert, 2005), with the leaders in society being those who can move easily between the disciplines (Wilson, E.O. 1998; National Academies cited in Boix-Mansilla, Dawes Duraisingh, Wolfe, & Haynes, 2009). To this extent interdisciplinary studies at both secondary and tertiary levels have emerged and are reportedly popular in the American academy (Boix-Mansilla et al., 2009) with over 99% of Liberal Arts colleges in the U.S. declaring that they are orientated in this direction (Rhoten, Boix-Mansilla, Chun, & Klein, 2006). The Royal Society of New Zealand has also acknowledged this and has made provision for the transition. In February 2010 the Fellows of Te Whaingā Aronui Council for the Humanities were formally welcomed into the Royal Society of New Zealand to promote a cross-fertilization of ideas (Royal Society of New Zealand, 2010). The Royal Society’s initiative may overlap with what Slingerland and Collard (2012) and Slingerland (2014) have called the “second wave” of consilience where there is a two-way exchange of insights from the arts and sciences rather than the absorption of the arts into the natural sciences as they argue E.O. Wilson (1998) is proposing.

The New Zealand Curriculum that guides teaching for Years 1-13 of schooling provides opportunities for a greater merger. The “Vision” seeks to connect students to the “Land and the Environment” (p. 8). “The Values” endorse sustainability, lifelong learning, and critical thinking to enable students to become informed decision makers (p. 10) (see MoE, 2007). Through the “Principle of Coherence” *The New Zealand Curriculum* (2007) encourages the teaching of “natural connections” between and within the Learning Areas (p. 16) as a “guiding principle” (MoE, 2007).

The Principle of Coherence entails three key ideas: achieving a “broad education”, facilitating student transition to future learning and making connections between topics and subjects or “learning areas” (MoE, 2007). The Education Research Office (ERO) identifies that among the eight Principles, the Principle of Coherence is one of the four least enacted in New Zealand schools¹. ERO recommends that the MoE supports school leaders and teachers

¹ The other three neglected Principles are the Treaty of Waitangi, future focus, and cultural diversity.

to gain a deeper understanding of the neglected Principles (see ERO, 2011). The purpose of this thesis is to make steps towards assisting secondary schools in New Zealand to be more readily able to fulfil the Principle of Coherence.

In this thesis I explore the application the two forms of consilience mentioned above. First, I have undertaken to create interdisciplinary connections between the arts, biology and the study of the French language at a senior level in the New Zealand secondary school system. In this regard I consider the extent to which consilience can contribute to the fulfilment of the “Principle of Coherence” in *The New Zealand Curriculum* (2007). Second, I explore the possibility of monitoring student learning through a pattern of ecosystem change of panarchy, as described by Gunderson, Holling and Peterson, (2001).

I propose that engagement in these two undertakings as an individual human being and stake holder in the teaching and learning process may constitute an approach to seeing learning progressions as the product of, and nested within, the complex systems of co-evolution with our fellow human beings and other species.

In this thesis I have drawn on aspects of the forms of consilience to create opportunities for integrated task based language learning (TBLT), and for monitoring student responses to those innovations. I introduce E.O.Wilson’s consilience thinking into the arts in the context of learning languages. Specifically, I have included aspects of consilience as topics of discussion in a senior French language class in a New Zealand secondary school. For example, students investigated various aspects of human behaviour such as a Darwinian interpretation of French medieval courtly love. Students also considered human habitat preferences in relation to New Zealand landscape painting and the country’s branding image for international tourism.

Secondly, in accord with Wilson’s (2012) “congruence” I interpret student responses using a model of ecosystem change known as “panarchy” based on notions developed by Gunderson, Holling and Peterson, (2001 p. 74). I propose this ecological model be used to frame student learning as well as the teaching and learning of consilience as a step towards the fulfilment of *The New Zealand Curriculum* “Principle of Coherence” (MoE, 2007 p. 9).

In summary, in this thesis I use panarchy as a novel theoretical framework for a qualitative case study to explore, describe, and explain student responses of teaching consilience

between the arts and natural sciences. At the time of this research, panarchy as a tool for mapping student learning progress was new, but Stanger, Tanaka, Tse, and Starr (2013) have recently employed panarchy for a similar purpose, quite independent of this project. In Chapter 7, I compare their work in relation to the way in which I employed panarchy.

My Experience and Background

All researchers come to their research with “orientating ideas, foci and tools” (Miles & Huberman, 1984 p. 27). In 1997, I completed a Master of Science in Environmental Science at the University of Canterbury. My thesis topic was: A concept plan for the ecological restoration of Otamahua/Quail Island. Since then I have gained over ten years’ experience in teaching the integration of natural science and the humanities through English language instruction in the leading French schools of engineering, physics, applied mathematics and telecommunications and architecture.

In preparation for this thesis I have immersed myself in the secondary teaching world in New Zealand. Here I experienced first-hand teaching for science with biology as well as the French teaching at all levels, and across the range of decile scores. Decile scores are derived from national census and reflect socioeconomic ranking of the families of students and the area where the school is located. A decile rating of 1 is very low 10 is the highest. A decile 10 school would receive very little government funding (MoE, 2015).

I completed the Diploma in Teaching and Learning (Secondary School) after the French teaching experience with especial training in teaching Science with Biology and French years 7-10. In my teaching placements I taught senior Science and Biology at a decile 2 co-educational secondary school, and at a decile 10 private girls’ school where I taught Science, Biology, and French. The latter school became my choice and permitted access to undertake my case study that comprises the field research component of this thesis. I refer to this school as School #1. Over the course of my research I worked as a part time French teacher in two schools: a decile 8 co-educational secondary school where I relieved over a six month period teaching Year 12 and Year 13 French (School #2); and finally for a period of 12 months at a decile 8 state girls’ school where I taught French to Years - 11 (School #3). At the latter school I also co-ran the school philosophy club and French club. Collectively these experiences have played a role in how I conducted this research and how I interpreted data.

Personal Teaching Dilemma - Developing Socratic Inquiry and Problem Posing Education

To know how to teach is to create possibilities for the construction and production of knowledge rather than to be engaged simply in a game of transferring knowledge. When I enter a classroom I should be someone who is open to new ideas, open to questions, and open to the curiosities of the students as well as their inhibitions. (Freire, 1998 p. 49)

For this project students were invited to engage in learner-centred, small group, open-ended discussion. These discussions were directly aimed at penetrating beyond the banal, less challenging content and superficiality that often characterises the topics of traditional second language lessons (Cross & Gearon, 2013). Such topics abound in English Language Teaching (ELT) textbooks, the teaching that these texts influence, and the subjects of student conversation (Siegel, 2014); that is, the aim was to seek deep understanding of topics and critical thought through a process of stimulus, questioning, and evaluation that overlaps with Socratic inquiry in English as a Second Language (ESL) (see Burder, Tangalakis, Hryciw & Hryciw, 2014). The mechanism of going deeper was via through E.O.Wilson's notion of consilience (Slingerland & Collard, 2012; see Chapters 2 and 3) whereby a discussion of the superficial is deepened by seeing it through an evolutionary lens. Consistent with Socrates' style of teaching that involves enquiry while teaching² or teacher-student dialogue as a response to what Socrates perceived as the inefficacy of the didactic or lecture style of teaching (see Adler, 1984; Coffey, 2009; Burder et al., 2014). Each lesson included personal dilemmas that I wished the students and their teacher to consider that also served as a means to seek answers, to incite critical thinking, and language acquisition. With the addition of a personal dilemma this process overlaps with Socratic inquiry and more specifically with Freirean dialogue which I detail later in this section and in greater detail in Chapters 3 and 4, Appendix 1 Unit of Work.

² Socratic enquiry should not be confused with Teaching as Inquiry in the New Zealand Curriculum (2007). The latter refers to teachers seeking appropriate strategies to meet the learning needs of all students in their class. Teachers aim for improved learning outcomes for all students and teachers see what works and what does not make adjustments to their teaching accordingly (MoE, 2007). The lesson content is usually not under question.

Socratic inquiry (Adler, 1982; 1984), inquiry-based teaching, or the discovery approach to learning (Lee, 2014) can easily be integrated into second language teaching and meets the need for the promotion of greater thinking skills beyond second language acquisition (see Sanner & Wilson, 2008; Davidson & Dunham, 1997; Burder, Tangalakis, Hryciw, K & Hryciw D, 2014; see Cross & Gearon, 2013; Lee, 2014). As aspects of Socratic inquiry have been trialled in ESL with success in terms of promoting critical thinking (see Davidson & Dunham, 1997 ; Burder et al., 2014; Lee, 2014; Othman, Sahamid, Zulkefli, Hashim, & Mohamad, 2015) and in generating a meaningful learning experience (Lee, 2014; see also Garrison, Cleveland-Innes, Fung M. & Fung, T. 2010).

Socratic inquiry underpinned the Nature Art and Language (NAL) course I developed while teaching at the Grenoble Institute of Technology in France, and forms a foundation principle in the pedagogical approach in the Unit of Work developed for the case study at School #1. The NAL course overlapped with the current definitions of with second language immersion or bilingual programme otherwise known as a Content and Language Integrated Learning (CLIL) program for the tertiary context where English was the medium of instruction (cf Cross & Gearon, 2013). CLIL is also known as second language immersion programs, and bilingual programs. All these forms consist of a dual focus on the acquisition of the target language and a specific learning area such as biology, the arts and so on (Smala, 2013).

In particular, The NAL program overlapped with the technique of integrating new language and new content. The objective was to expose the learner to ideas that they had not encountered before such as the Gaia Hypothesis (Lovelock, 1979) or a study of Shakespearean texts in English. In this way I avoided the superficial cross linking of curriculum subject (see Hood & Tobutt cited in Coyle, 2008), whereby there was a direct translation of familiar ideas from other curriculum areas.

CLIL developed in the 1990s in Europe and was built on the success of the Canadian French immersion programmes for content taught in French (see Krashen, 1984; Cross & Gearon, 2013). Unlike the immersion programmes CLIL does not have a set theory but a number of “theoretically rich and robust” (Cross & Gearon, 2013 p. 17) guiding principles that teachers follow (Coyle, 2008).

They are in brief:

- that knowledge is constructed
- the content must be accessible to the learner
- cognition is dependent on language
- the learner needs opportunities to contemplate the material and take ownership of it
- the central focus is transformative learning for global citizenship,
- forging a student voice in the target language (Cummins in Coyle, 2007)
- “experiences that provide occasions for authentic and purposeful meaning-making through language” (Cross & Gearon, 2013 p. 16).

CLIL has had an important impact on language teaching in the European Union owing to a number of advantages. These include greater student engagement (Coyle, Hood, & Marsh, 2010) and this may be because of increased motivation to learn meaningful content in a foreign language and with a lower affecter that characterises good CLIL (Muñoz, 2002) and Task-Based Learning Teaching (TBLT), (East, 2012). Improved proficiency in the target language and greater language retention as recorded in second language tests (Wesche, 2002). Not only is language acquisition better than in traditional language programmes, but students do equally as well, or better academically, in the learning area that is the focus in a CLIL course than students in monolingual class (Dalton-Puffer, 2008). Further, students have been shown to improve in literacy in their first language in CLIL classes (Muñoz, 2002, Alberta Ministry of Education, 2010). Lastly, students become more interculturally aware and capable than in non-CLIL language classes (Rodríguez & Puyal, 2012.) Despite its advantages CLIL is reportedly very challenging to implement outside the Canadian context, as was noted in Cross and Gearon’s (2013) evaluation in schools in Victoria, Australia.

The Unit of Work can be seen as integrated language and new content programme introduced into the existing language programme (see Coyle, 2008) in the French class at School #1. The first three lessons in the unit contain questions. In lesson 1, I sought to find an evolutionary answer to the mystery of the origins of French medieval courtly love tradition and literature. In Lesson 2 I inquired with the participants into the authenticity of France versus New Zealand, between the natural and the built environments. In Lesson 3, I investigated the authenticity of landscape preferences, the reactions of the participants to the environmental reality of New Zealand and its tourist branding image of *100% Pure*.

My approach has overlap with Freire's (1970 p. 71) problem posing education and his concept of dialogue whereby both teacher and student learn through the educational experience. As this approach is problem solving centred, it also overlaps closely with more positive aspects of integrated learning as recommended by Venville, Wallace, Rennie, and Malone (2001) and as defined by Fraser (2000). Freire's Problem Posing Education is outlined before tying it to integrated learning.

Freire's approach involves four phases as distilled by Jansen (2011). Students respond to a problem by giving their own interpretation and answers; that is, their "*Own Story*". At this stage students engage with the activity through their own experiences (Tredway, 1995) Next, students consider the texts and findings of researchers and writers; that is, the "*Expert Story*". After this, students examine the "*Expert Story*" for positives and negatives; that is they engage in "*Critique*". Finally, students compare the "*Expert Story*" with Their "*Own Story*" and make a judgement or "*Evaluation*". Questioning was focused on making sure students understood key language elements as well as the gist of the text, but questions were also designed in accordance with Socratic inquiry. Drawing on Coffey (2009) my questions were a) drawn from my own curiosity as the author of the texts in the Unit of Work, b) had possibly no known correct answer, and c) were constructed to be as open as possible to create dialogue for which it was necessary for students to have gained understanding of the texts and the language to support their discussion.

I felt that one of the biggest teaching obstacles to successful Socratic inquiry was to balance the teacher's role as both facilitator and participant (see Tredway, 1995); that is, when to intervene and tell students the answers, when to allow the students to work things out for themselves, and when to keep quiet. Fraser (2000) discusses carefully timed scaffolding in "issues driven" or problem solving centred integrated learning (p. 21). Precisely this issue is discussed by Fraser (2000) who examines carefully timed scaffolding in "issues driven" or problem solving centred integrated learning (p. 21). I was mindful of end of course student feedback I had received where students objected to any attempt on my part to change their values or convince them of ecological thinking. Consequently, I became conscious of the danger in exposing one's values as a teacher and its impact on student willingness to participate and speak freely in class. The reasoning being that students may be fearful that disagreement with the teacher may result in lower grades.

Further, I remarked that if I intervened in a conversation the students went quiet as though they had been dampened. It was challenging to remain reticent when I felt there was some piece of knowledge I thought the students needed to know. At other times it was necessary to intervene when students had mistranslated a word that would lead them astray through “a communication breakdown” (Cross & Gearon, 2013 p. 55). That is, the success of a lesson could depend on the successful translation of a single crucial word (see Cross & Gearon, 2013). For example in a lesson where I taught the Daisy World model for the Gaia Theory (Lovelock, 1995). I began a Socratic series of questions based on Lovelock’s own reasoning. The opening question was, “Why is the sea salty?” One of my Tunisian students translated the question into French as, *Pourquoi la mer est sale ?*, and back into English as “Why is the sea dirty?”. The confusion lay in the French word for ‘salty’ which is *salé(e)*, and the French word for “dirty” which is *sale*. He believed that the question related to the origin of ocean pollution not to the origin of salt in the sea.

By passing the teaching role over to the teacher at School #1 and simply observing what happens I felt I could see what teaching consilience in a language class looked like and whether another teacher could do it.

Background to the Teaching of Consilience

Consilience is not taught by name in New Zealand, but appears to have overlap with integrative learning. This has included making science relevant, connected to society as well as to the lives of students (Fraser, 2000). Fraser (2000) defined integrated learning in terms of four key characteristics:

- Where the curriculum is negotiated between the teacher and students
- Where the topic is not a theme but an issue or problem that is of relevance to the learners
- Where teachers provide scaffolding or feedback to guide the learner in their progress toward problem resolution. This may take the form of direct teaching, “a well placed statement”, questioning to raise learner curiosity (p. 21)
- Where the learner(s) draw(s) on learning areas naturally relevant to resolving the issue

Consilience in the sense of biologically determined human nature could be taught in senior Biology classes as part of *The New Zealand Curriculum* evolution of culture and spirituality,

through classes in Psychology and Philosophy. The effect of integrated learning for second language training in the forms of Sustained Content Teaching (SCT) (Pally, 2000), Content Based Instruction (CBI) (Mohan, 1986; Brinton, 2003; Nunan, 2004), CLIL is well studied and reportedly shows very good results with students learning more language because language is not the focus (Coyle, 2008; Eurydice Report, 2006).

Now that I have set out the thesis rationale, thesis topic, my teaching experience and personal teaching dilemma, I present the four research questions that are drawn from the preceding discussion and constitute the basis of this investigation.

Research Questions

Research Question 1:

In terms of the adaptive change and panarchy metaphor, how did selected students respond to the integrated learning task in the consilience unit with a Year 13 French class in a New Zealand secondary school?

Research Question 2:

From the responses, what are the factors that enable the teaching and learning of consilience themes in a Year 13 French Class, and what factors act as barriers?

Research Question 3:

- a) To what extent can the learning experience be described using panarchy as a theoretic framework?
- b) From that the development of that description, what insights can be gained for the refinement of the theoretical framework and understanding about the learning process?

Research Question 4:

What insights about the learning process interpreted using Panarchy can be gained through Ernest Hemingway's short story *Big Two-Hearted River*.

Choice of Research Design

The aforementioned thesis topic is novel. The most appropriate approach to researching this topic is qualitative. This is because qualitative research is often used to open up new subject areas and ways of seeing specific phenomena (Lewis & McNaughton, 2014 loc.1476). Specifically the research design of the qualitative case study (Lewis & McNaughton, 2014) is suited to an exploration, description and interpretation of what is happening in a new situation (Robson, 2011; Cohen et al., 2007; Gibbs, 2012).

By definition a case study is an empirical investigation of a contemporary phenomenon in its real life context (Robson, 2011). The case study examines real people in real life situations; that is, it depicts an instance in action (Alderman et al., 1980), it draws on multiple sources of evidence (Yin, 1994), and it aims at a rich (Cohen et al., 2007) and holistic description (Merriam, 1998). A case study is most often associated with qualitative research design that aims to provide multiple perspectives of a single context (Lewis & McNaughton, 2014).

Choice of School

I chose School #1 for two key methodological sampling reasons for non-probabilistic research: “purposive” and “convenience” (see Mutch, 2005 p. 50). First, School #1 suited the purpose of the investigation. Consilience is an academic topic. It requires high level thinking skills. It is by its nature philosophical. I required a school that had a tradition in valuing philosophy and an academic reputation. It should be a school where I could be assured that students would undertake and complete the assigned tasks and I would be able to judge the feasibility of the consilience material. Second, School #1 was the most convenient. I was familiar with the school culture. In 2010 I completed my second placement for the Diploma and Teaching and Learning (Secondary) at the school. Furthermore, the administration and class teacher were cooperative and willing to participate in the investigation.

School #1 profile.

School #1 is a private decile 10 school, located in New Zealand.

The school promotes its high academic achievement and strong tradition in pastoral care. This is supported by the ERO report on School #1 for 2010. The following extracts come from that document:

Students are confident and articulate with a strong sense of wellbeing. ERO observed strong, positive and affirming relationships among teachers and students (ERO, 2010a p. 3)

The board and teachers expect students to contribute positively to the wider community, appreciate cultural diversity and be responsible national and international citizens. A strong ethic of care is evident among staff and students. (ERO, 2010a p. 4)

Students support each other and work cooperatively to achieve at a high level.

Students readily accept instruction and tutoring from other girls. (ERO, 2010a p. 3)

Quality of teaching is considered high and innovative consistent with the key competencies of *The New Zealand Curriculum*:

Teachers are competent in their curriculum areas. Planning and assessment is thorough across subjects and year levels. ERO observed some teachers delivering interesting lessons based on innovative teaching practices and the key competencies of *The New Zealand Curriculum* (ERO, 2010a p. 3).

All junior students receive Maori language (Te Reo) instruction and instruction in Maori cultural awareness and biculturalism (ERO, 2010a). Maori constitute 5% of the school roll and 22.8 per cent of the domestic roll (Education Counts, 2011).

Reasons for choosing this school were cited as the strong academic qualifications of the teacher and the highly academic nature of the school (ERO, 2010a):

Student achievement at all levels of the National Certificate of Educational Achievement (NCEA) is significantly higher than for girls at similar schools. In addition, many students achieve at high levels in sport, music and in cultural and other areas (ERO, 2010a p. 4).

The school was open to curriculum integration and had already implemented cross curricular programmes at junior levels, as ERO (2010a) notes:

Some teachers are beginning to develop learning initiatives across different areas of the Curriculum. These initiatives incorporate key competencies from the curriculum. For example, the arts, English, social studies and technology departments are providing integrated learning experiences for students in Years 9 and 10 (p. 4).

The school has a Christian Presbyterian focus.

The school presented itself as an ideal learning environment that was open and willing to participate in this investigation. The school runs an academic programme in philosophy. Three of the seven students in the Year 13 French class were active members in the school philosophy club and two of the seven were taking a course in Philosophy.

The Unit of Work: controversy in cultural artefacts and behaviour as the basis of discussion.

The Unit of Work has accord with principles of task based language teaching (TBLT) and integrated learning. These are learner-centred and experiential approaches to language learning, and are in alignment with the focus of *The New Zealand Curriculum* (MoE, 2007) for languages (see East, 2014b). The teacher admitted that she had not taught in this manner (see Lesson 1 teacher-researcher debrief notes, Appendix 2). Evidence from the data set (teacher-researcher debrief notes; observational notes, and transcripts) shows that her teaching style was akin to a teacher-centred didactic, grammar and translation approach.

The Unit of Work contained an array of cultural artefacts considered compatible with Level 8 French in *The New Zealand Curriculum in Learning Languages*. Each artefact was used as the basis of discussion or “stimulus material” to elicit participant reaction through discussion in the target language of French; that is, each artefact was designed to make the learner think and apply their knowledge to resolve an issue that requires an interdisciplinary approach (see Socratic method described by Adler, 1982, 1984; Copeland, 2005; Coffey, 2009; Boix-Mansilla et al., 2009). The artefacts discussed are human courtship protocol (Lesson 1), traditional food (Lesson 2), landscape painting (Lesson 3), the practice of conservation (Lesson 4), Maori environmental values (Lesson 5) and the way we see our place in Nature and society (Lesson 6). Chapter 3(Theoretical Framework) and Chapter 4 (Methods) provide further detail. Each artefact was considered in terms of how it related to an evolved human nature, the evolution of culture and/or how it related to the environment and our perceived role in it. All of the lessons contained deliberate points of controversy. E.O.Wilson’s notion of consilience asserts that defining human nature is at odds with many in the humanities who consider there is no definable human nature. This element of controversy serves to enliven and broaden the potential conversation, thus opening the door to hear religious, Marxist, postmodern and social constructionist viewpoints. In this way, the level of discussion can be

lifted above the familiar and superficial to meet the prescriptive expectations of the content of discussion at Level 8 of *The New Zealand Curriculum* for Learning Languages.

French Language Teaching in New Zealand and Consilience

Here I provide an overview of how a senior French language programme is organised in a New Zealand secondary school in terms of *The New Zealand Curriculum* and the assessment regime.

The New Zealand Curriculum and Assessment Context

The New Zealand Curriculum (2007) is the official policy statement concerning teaching and learning in New Zealand. The main function of the document is to direct student learning and provide guidance for schools (MoE, 2007). *The New Zealand Curriculum* was authored by the MoE whose role it is to direct education providers and agencies as well as operating as chief advisor and policy developer for the Government on education matters (MoE, 2015).

The New Zealand Curriculum identifies eight “learning areas”: English, the arts, health and physical education, learning languages, mathematics and statistics, science, social sciences, and technology (MoE, 2007 p. 16). Students in “learning languages” learn to “...communicate in an additional language” as well explore other cultures and learn to learn other languages (MoE, 2007 p. 18). All learning areas are divided into eight curriculum levels. Level 1 assumes students have no previous knowledge of the target language (MoE, 2007 p. 24). It is, however, acknowledged that many students do not fit the model given. Each student comes with a particular learning history and teachers are expected to make provision for this (MoE, 2007). With an absence of coherence between primary and secondary teaching students may have received training at primary level but enter a high school and are placed in a Year 9 class having to start again from Level 1. This is arguably one of the reasons for the falloff in enrolments in languages (RSNZ, 2013) and in French, in particular (Yogeeswaran & Clarise, 2015).

At Curriculum Level 8/NCEA Level 3/Year 13 students are expected to be able to discuss ideas in French (MoE, 2007).

Learning Languages under *The New Zealand Curriculum* is composed of three *strands* of Communication, Language Knowledge and Cultural Knowledge. Communication is the

central purpose and referred to as the *core strand*. Cultural and Language knowledge are known as the *supporting strands* and their purpose is to support the raison d'être of communication as the MoE (2014) states on its online page *New Zealand Curriculum Guides for Senior Secondary*:

Communication is the core strand because being able to communicate is the core aim of all language learning. The other two strands are directed specifically at developing the linguistic and cultural awareness needed for intercultural communicative competence.

The achievement objectives in the communication strand provide the basis for assessment. The two supporting strands are assessed only indirectly, through their contribution to communication.

At *The New Zealand Curriculum Levels 7 to 8* students are expected to be able to express themselves supporting their views and engaging one other in challenging discussion in the target additional language (see MoE, 2007 p. 10). This is summarised in the *New Zealand Curriculum* "Proficiency Descriptor" on the *Languages Wall Chart* presented below:

Students can use language variably and effectively to express and justify their own ideas and opinions, and support or challenge those of others. They are able to use and identify the linguistic and cultural forms that guide interpretation and enable them to respond critically to texts.

This strongly suggests students in the Year 13 case study class at School #1 should be able to engage in class discussions and debates with both the teacher and their peers.

As it is used in this quotation to refer to any language resources at the student's disposal to create meaning. This would be consistent with Ross and Gearon's interpretation of CLIL in the Australian context. Cross and Gearon (2013) the most important aspect of a CLIL programme is the development of higher level engagement and understanding. They argue that students in a CLIL programme should not be obliged to engage with one another in the target language, instead they should be free to use whatever language resources at their disposal to make meaning. As a proviso, Cross and Gearon (2013) recommend that English could be used only if the responses from students emerge from the target language. Although the rationale is an interesting one, the MoE have confirmed that the wording of the

Proficiency Descriptor should remain as written and that clarification of the word language was not necessary. Rather, the word should be interpreted in terms of the context of the entire New Zealand Curriculum (Benge, F., personal Communication, 9/6/2015).

Assessment of student capacity is measured through the NCEA which is the chief qualification for secondary schools and is administered by the New Zealand Qualifications Authority (NZQA), which reports to the MoE. NZQA's role is to ensure that New Zealand qualifications are useful in terms of future careers for students, of value to New Zealand society, and are regarded robust and credible both locally and overseas (NZQA, n.d.; 2014).

French in New Zealand secondary schools.

French is the fourth most spoken foreign language in New Zealand (NZ Census, 2013). The Asian New Zealand Foundation and Colmar Brunton survey (2014) identified French as the fourth most useful in terms of utility for trade, after Chinese, Spanish, and Japanese. French is the most popular additional language in New Zealand secondary schools (Yogeeswaran & Leschi, 2015). With the exception of Chinese and Spanish, enrolments in French, along with all other languages offered to students, are in decline (Language Counts, 2012; cf East, 2012). This overall attrition is thought to be due to three factors:

- The lack of national policy for languages in New Zealand
- The non-compulsory nature of languages in the curriculum
- The lack of planned progression between primary, secondary, and tertiary levels (RSNZ, 2013; McGee, et al., 2013; Yogeeswaran & Leschi, 2015; Harvey, S, personal Communication, 29/5/2015; Tan, 2015).

In accord with the above factors, East in his 2012 investigation of teacher perceptions of foreign language teaching in the New Zealand context concluded that the New Zealand Curriculum Framework (NZCF) and the systems of assessment operated as a barrier to foreign language teaching. Harvey, S, personal Communication, 29/5/2015 attributes the fall off in enrolments to problems of resourcing in schools, the perception that there is little necessity to learn a foreign language for English native speakers (see also East, 2012) and the failure to properly implement the prescriptions of *The New Zealand Curriculum* into schools for Learning Languages and globalization. Despite this a survey in Victoria, Australia conducted by Cross and Gearon (2013) indicated that students take language learning

seriously in contrast to the popular rhetoric against it. The same survey emphasised that parental support for their child's language learning was crucial in the viability of CLIL programmes in that context. Parental support could be achieved through open communication with schools.

Of note for this investigation is that because of these challenges the current level of fluency of French for students in New Zealand secondary schools does not meet the requirements of relevant employers (Yogeeswaran & Leschi, 2015). Furthermore, Yogeeswaran & Leschi (2015), add that the comparatively low number of language contact teaching hours New Zealand students receive in comparison to their Australian and British counterparts, is an area of concern.

At the time of the case study at School #1, the student level of spoken French was assessed using two internally assessed tasks: Oral Presentation NCEA AS91544 (subject reference French 3.2) and Converse NCEA AS90560 (subject reference French 3.3). The consilience unit prepared for the case study sought to provide students with opportunities to train for both assessments. Students would work towards the production of a 2-3 minute podcast and they would engage in discussions and debates in French with their classmates and teacher.

It is noteworthy that the Assessment Standard AS90560 Converse was discontinued at Level 3/Year 13. It was considered that interviews between teacher and student had a tendency to be "contrived" and the presence of the teacher put students ill at ease and that this had an adverse effect on student fluency (East, 2011, 2014a). At Level 1/Year 11 and Level 2/Year 12 Converse was replaced by Interact AS90880 - Subject Reference French 1.3 and AS91119 - Subject Reference French 2.3 (NZQA, 2012b).

NZQA moderators of the internally assessed "interact standard" (a measure of language fluency) report an "abundance" of rehearsed role plays rather than the required authentic and spontaneous conversations (NZQA, 2012). The NZQA guidelines for the internally assessed Learning Languages Interact standard stipulate that pre-scripted and rehearsed role plays as authentic and spontaneous conversations are "inappropriate" and "cannot achieve" (NZQA, 2012 p. 1). Moderators indicate that there remains confusion and tension between the requirement for accuracy and fluency. Both teachers and students will not allow themselves to speak fluently lest they make mistakes (see NZQA, 2012). The New Zealand Association

of Language Teachers (NZALT) count authenticity of oral evidence as an issue (NZALT, 2015; see also East, 2015).

Authenticity is a central concern for oral language assessments it is arguably a necessity for second language acquisition and the transformative experience (Bachman, 1990). Language acquisition can occur during moments of authentic communication in the target language. Such moments are arguable instances of “flow” (see Csikszentmihalyi, 1991) where consciousness of language features have been forgotten and students focus solely on the communication of ideas (Krashen, 2004a; 2004b; 2011). Without authentic exchanges in the target language the underpinning goal of the Unit of Work to provoke both learner transformation and language acquisition can only be compromised (see Chapter 5 and Chapter 6 for results and Chapter 7 for discussion).

Thesis Plan

Thus far I have outlined the reasons for undertaking this investigation, the nature of the investigation, and the context in which it occurred. In this section I give a précis of the structure of the rest of the thesis in the form of a reduced description of the purpose and contents of each of the remaining six chapters.

In Chapter 2: What is Consilience? I discuss the derivation of current uses of the term “consilience” starting from its appearance in the 1840s to its current mutations. I make the point that even though E.O. Wilson’s concept of consilience was to unify knowledge through a merging of the various specialised disciplines, the term consilience itself is now in the process of being divided for specialisation. The major portion of this chapter is dedicated to the controversy that surrounds E.O. Wilson’s theory of consilience.

In Chapter 3: Theoretical Framework, I develop theoretical framework for making sense of classroom case study data. I use panarchy as a perspective of teaching and learning. By viewing the responses to consilience in this way there is the potential to generate rich interpretive descriptions that may lead to insights about the teaching and learning process. This chapter contributes to the development of consilience through congruence by aligning the importance of experiential idea acquisition with the cyclic adaptive changes in a terrestrial ecosystem.

In Chapter 4: Methods, I explain the methodology as an ethnographic evaluative case study after the criteria given in Merriam (1998). I seek to provide a rich and thick description of the responses of two participants known as L4 and L5 to the Unit of Work. I use the metaphor of the adaptive change cycle and panarchy as a lens through which to view those responses.

Chapter 5: Results (1) and Chapter 6: Results (2) constitute the answer to Research Question 1 through which I explicate how selected students responded to the integrated learning task in the consilience unit in their French class. I present the results of the analysis of classroom transcripts for students L4 and L5 respectively. I plot the stages of student learning onto a template of the adaptive change cycle.

In Chapter 7: Discussion, I answer Research Question 2 and identify from the data the factors that enabled and those that acted as barriers to the teaching and learning of consilience themes in the Year 13 French class at School #1. Next, I address Research Question 3a and evaluate the use of the panarchy metaphor as a theoretic framework. In this chapter I discuss the panarchy metaphor in relation to Kolb and Kolb's (2009) experiential learning cycle, and its interpretation in *The New Zealand Curriculum*. Further, Stanger Tanaka, Tse and Starr (2013) developed a panarchy metaphor to interpret transformational learning independently of my own research initiative. In this chapter I discuss key insights from their usage of panarchy and essential differences. I discuss the effectiveness of the metaphor in terms of how well it could be used to describe the learning process of the two selected students. Finally, in this chapter I discuss the limitations of the research methodology.

In Chapter 8: Insights, I undertake to answer Research Question 3b. I detail directions for a deeper understanding of the panarchy of learning metaphor. These directions were gleaned intuitively while using the theoretical framework to interpret the data. From these directions, insights emerge into the nature of teaching and learning in the context of *The New Zealand Curriculum*. Specifically, I explore the nature of the ecosystems as self-organising structures that dissipate energy flows (after Schrödinger, 1967; Prigogine, 1987; Kay, 1999) and mindful of the work of Doll (1986), Karpiak (2000) and Gilstrap (2007) I develop a metaphor of for ideas and learning as the dissipation of flows of information and power from the teacher. Next, I develop an ecological view of Conner's (2014) evaluative constructivism; that is, the selective process whereby students choose what they learn in respect to their learning capacity. I propose that evaluative constructivism can be thought of metaphorically as an ecological filter; that is, the array of biotic and abiotic factors that determine which

species establish in a developing ecosystem (Hobbs & Norton, 1996). Lastly in this chapter I interpret *The NZC Key Competencies*; that is essential competencies for lifelong learning in terms of the three dimensions of the adaptive change cycle.

In Chapter 9: I participate in the second wave of consilience and draw on a work of relevant fiction for added insight into the case study at School #1 and the panarchy of teaching and learning. I investigate Ernest Hemingway's short story *Big Two-Hearted River*. The story treats the protagonist's process of recovery from trauma as mirrored in the setting of a post-forest fire landscape. This process is readily interpreted in terms of ecological panarchy and hence teaching and learning.

In Chapter 10: Conclusions I recapitulate the aims of this investigation and detail contributions to knowledge and directions for future research.

CHAPTER 2

CONSILIENCE, CONTROVERSY, COHERENCE & GRACE

The purpose of this chapter is twofold: first, to detail the nature of the concept of consilience in its various forms; second, to demonstrate the resonance consilience has with the concept of grace. As noted in Chapter 1, I suggested that the utilisation of consilience, both as congruence and as evolutionary psychological interpretation of culture, provides a means to fulfil the Principle of Coherence in the New Zealand Curriculum for the Learning of Languages. In so doing there is thus an overlap of consilience, grace and the curriculum. This overlap I refer to as curriculum grace.

There are currently three or four variants of consilience. First, there is Whewell's (1847) original conceptualisation of consilience as a process of abstraction of inductions to form a generality. Second, E.O. Wilson (1998) revised Whewell's consilience as a sociobiological explanation for the arts, whereby the arts are connected to human biology, and more broadly are subsumed into the sciences. Third, there is the notion of consilience as congruence after D.S. Wilson, and Pigliucci (2012). Congruence is a study of cultural diversity using the same evolutionary framework to explain biological diversity (after Wilson, 2012; Wilson, D.S. & Green, 2012. Wilson, D.S. Ostrom & Cox, 2013; Wilson et al. 2014). Fourth, Slingerland and Collard (2012) have introduced the "second wave" of consilience that they consider encompasses congruence but includes the free exchange of ideas between the arts and sciences (p. 23).

First, I detail the etymology and nature of Whewell's (1847) consilience. Second, I discuss E.O. Wilson's conceptualisation of consilience and its purpose in his attempts to think of a way out of the environmental bottleneck that he believes humanity and global biodiversity

are facing. Third, I discuss the controversy surrounding E.O. Wilson's consilient world view particularly as it relates to his earlier concept of sociobiology. I detail its clash with the Standard Social Science Model (SSSM) that perceives the mind metaphorically as a blank slate. The fourth section of this chapter is entitled *Détente*. Here I outline aspects of a rapprochement between the two academic cultural camps that has come through mutual exchange of ideas and an acceptance of evidence that neither side has a monopoly on the truth. Following on from this I describe the recent moves to rework Wilson's (1998) consilience in the form and congruence after D.S. Wilson and Pigliucci (2012) as an expression of a second wave (Slingerland & Collard, 2012). In the penultimate section I suggest that through a blending of both Wilson's (1998) version of consilience and the revised form known as congruence there is a possibility of an approach to evolutionary wisdom or grace, which follows the ideas of Bateson (1972). I conclude this chapter with a summary of the key points.

Etymology and Historic Roots of Consilience

It is appropriate at this stage to examine dictionary definitions of consilience. These are contrasted with current usage later. Merriam-Webster's dictionary defines consilience as:

The linking together of principles from different disciplines especially when forming a comprehensive theory.

Whereas the Oxford online dictionary defines consilience as:

Agreement between the approaches to a topic of different academic subjects, especially science and the humanities.

The word consilience is attributed to nineteenth century thinker Whewell (Wilson, 1998), who used consilience to mean a jumping together (1847 p. 65). The word is a composite of two Latin words *salire* (to jump) and *con* (together) (Jung, 2002; Carey, 2013). The Oxford Dictionary indicates that consilience is related to resilience. With the prefix *re-* means to jump again or to rebound; with the prefix *con-* we get jumping together.

Whewell, who is also known for coining the word "scientist" in 1833 (Snyder, 2005, 2011 pp. 2-3), describes consilience as part of the generation of broad and inductive theory from specific inductive observations. The process of consilience involves the rapid and sudden

leaping together of inductions to form a generality. This new theory shows a tendency to simplification and unity (Whewell, 1847 pp. 73-74). Whewell's favourite example of consilience is that of the development of Newton's Law Universal Gravitation (Synder, 2011 p. 332). This law came to Newton as a rapid and sudden meeting or jumping together of the three laws of Kepler (see Whewell, 1847 p. 118).

Whewell describes this process of "the convergence of truth" as resembling an upside down table of ancestry, with the patriarch (analogous to the generality) at the bottom of the page and his descendants who are spread out above him (analogous to the inductions and lesser generalities) (p. 76). Whereas the many branches and twigs of the tree of life emerge from a common ancestor, in the consilience table, the multiplicity of inductions are progressively subsumed by generalities which are in turn subsumed into still broader generalities. Whewell (1847) also illustrates his idea of the process of the convergence of truths as the formation of a river from tributaries:

the streams of knowledge from various classes of facts will constantly run together into a smaller and smaller number of channels; like the confluent rivulets of a great river, coming together from many sources, uniting their ramifications so as to form larger branches, these again uniting in a single trunk (p. 76).

Consilience for Whewell was the best type of evidence for scientific theory. That he could draw the same conclusion about a phenomenon from evidence collected from diverse sources suggested to him that the conclusion is correct. For Whewell, it was very unlikely that a false theory could unify diverse phenomena.

Whewell's work *The History of the Inductive Sciences*, and in particular the processes by which great discoveries are made, influenced Darwin (Synder, 2011), who, following Whewell's examples of Newton, made a point to try to show that his theory unified facts in varying fields (Synder, 2011). There is overlap between Whewell's metaphor of the table of ancestry to illustrate his table of generality through consilience and simplification and Darwin's tree of life.

Whewell appears to be pointing towards an eventual theory of everything in the same way Darwin surmised the existence of a common ancestor of all classes of organisms (Darwin, 1859 Kindle location. 3560) (Figure 2.1). In this sense the process of generalisation of inductions or the convergence of truths appears to be the reverse of the process of evolution.

Furthermore, there is also overlap where an idea that is an induction can be thought of as analogous to a species, or to a meme; that is, a unit of culture. For Kuhn (1990) science is Darwinian and scientific revolution reminiscent of speciation events. Kuhn (1990) remarks that progressive specialisation of is reminiscent of the process of speciation. Thus the evolutionary tree echoes the imagery of a genealogic table of the theory of inductions suggested by Whewell (1847).

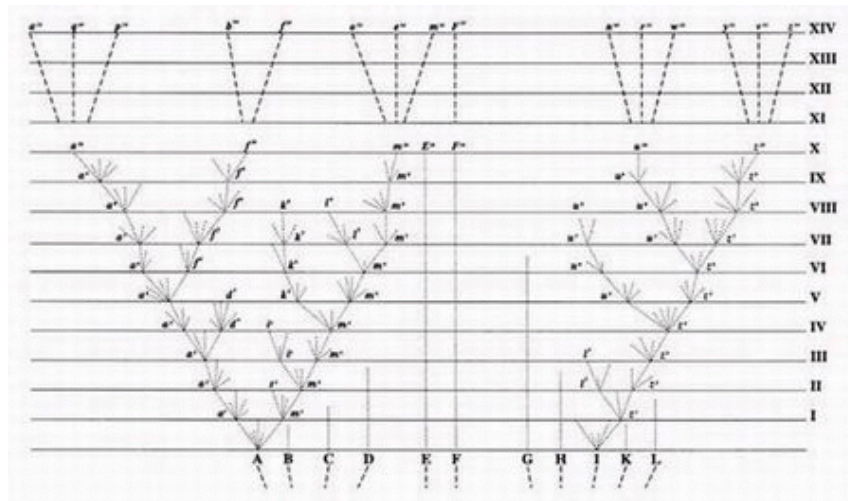


Figure 2.1 The tree of life from Darwin's (1859) *On the Origin of Species* revealing the analogous structure to Whewell's (1847) "Inductive Table of Astronomy" that illustrates "the convergence of truth"; that is, the formation of theory from inductions (p. 118).

E.O.Wilson's Conceptualisation of Consilience

E.O.Wilson's consilience is both a world view that engenders a vision for the future of humanity and the biosphere. In the final chapter of his book *Consilience, the unity of knowledge* published in 1998 "To What End", E.O. Wilson explains what consilience is for him and what it is for. Consilience is a world view (p. 297). It is the perception of "a seamless web of cause and effect [whereby]...all tangible phenomena ... are based on material processes that are ultimately reducible ... to the laws of physics. In support of this idea is the conclusion humanity is kin to all other life forms by common descent" (Wilson, 1998 p. 297). In this sense consilience overlaps closely with his earlier and most controversial work of *Sociobiology* published in 1975. In this volume it was suggested that human nature was the product of evolution and human culture was an expression of that evolved nature. E.O.Wilson's notion of consilience elaborated on this theme and could be thought of as a biological explanation for human nature and the arts and humanities.

Wilson trained in biology and specialised in entomology, notably the study of ants (Becker, 2009). Riccetti (2014) states that Wilson is recognised as “one of the great field biologists of our time” as well as being a thinker of international stature in the field of evolution and society, who is “deeply concerned about human impacts on biodiversity” (p. 1). As intimated in the final passages of *Consilience, the unity of knowledge*, the ultimate goal of consilience is to find a material solution for the precarious future of humankind and the fate of the Earth’s biodiversity. Wilson’s (1998) solution appears to be in an approach that he calls “existential conservatism” (p. 333, and see also Wilson 2014 p. 60). In the following passages I paraphrase Wilson’s concept, reducing it to its two constituent parts.

First, by “existential” Wilson means that we evolved and were not made and through technology we are free but not completely free to choose how we should live or be. We are constrained by a universal inherited human nature that influences how we think, what we prefer, and the decisions we make. We are also constrained by an environment that is finite in resources and menaced by an ever growing human population, that through a combination of hubris and technology reached an environmental bottleneck (Wilson, 1998; see also Bateson, 1972). Wilson’s existentialism tells us that we are both conscious of the potentials as well as the serious limitations that confront us (see Wilson, 1998 p.333; 2014 p.60; Pinker, 2002).

Given our present state just what form should humanity take in the future? This brings us to the second notion. Wilson’s (1998) “conservatism” refers to the human self without the deleterious genetic traits such as congenital diseases and behaviours that reduce the quality of life for sufferers and imperils our future on the planet, but at the same time preserves that which is most human (Wilson, 1998 p. 333; see also Wilson 2014 p. 60). To identify those traits that make us most human Wilson argues we must draw on the arts whose role it has been to discover and explore that which defines us and gives us meaning and purpose. In order to achieve that essence and to ensure that our population growth and our technology do not destroy us and the biosphere that supports us, we must draw on both the arts in particular ethics and the sciences to make accurate and wise decisions. In other words, how humans find meaning and purpose should not clash with the goals of biodiversity preservation; that is, they should be compatible with the goals of sustainable development (Wilson, 1998, 2014). Wilson (2014) predicts that what we will decide to retain in terms of human nature “the uniquely messy, self-contradictory, internally conflicted, endlessly creative human mind that exists today”, and we will call ourselves “existential conservatives” (p.118).

This world view overlaps Sowell's (1987) "constrained vision" of human nature. In this view we are "limited in knowledge, wisdom and virtue" and for good governance all social institutions must acknowledge these flaws (Pinker, 2002 p.287; Sowell, 1987). Further, the project of existential conservatism appears to echo aspects of the notion of "a science of intentional change" put forward by D.S.Wilson et al., (2014 p. 397). Under "intentional change" evolutionary processes are "wisely managed" in order to achieve "significant improvement in human well-being" (p. 397).

Criticism of E.O. Wilson's *Sociobiology* and *Consilience*

In this section I discuss the critique of Wilson's (1998) notion of consilience. This is included here, because the variants of consilience outlined in Chapter 1 have emerged from the controversy (Slingerland & Collard, 2012; Wilson, D.S.et al., 2014).

The Standard Social Science Model embodies the underlying assumption in the humanities that culture is by and large determined by the social environment that surrounds it (Tooby & Cosmides, 1992; E.O.Wilson, 1994, 1998, 2012, 2013, 2014b; Davis et al., 2000; Segerstrale, 2000; Singer, 1999; Orians, 2010; Pinker, 2002, 2012; Slingerland & Collard, 2012; Wilson, et al., 2014). E.O.Wilson's (1998) project of consilience is often interpreted as genetic determinism advocating the primacy of genetic inheritance as determining human culture. In addition, Wilson (1998) is unapologetic in his attempt to subsume the arts and humanities into the sciences. Rather than ameliorating the division between the two academic cultures of the arts and sciences (see Snow, 1959, see Chapter 1) Pinker (2012) along with Slingerland and Collard (2012) suggest that E.O. Wilson's position of scientism to be "unhelpful" (p.4).

I think, however, it is helpful to gain an understanding of the following: the intentionally provocative nature of Wilson's stance present in both the works of *Sociobiology* (1975) and *Consilience* 1998); his admission of ignorance of the humanities and political naiveté in regards to Chapter 27 of *Sociobiology* (1975); Wilson's philanthropic, environmental motivation as noted in the previous section; and, the attempts to seek common ground with his intellectual rivals, such as behaviourist B.F. Skinner (see E.O.Wilson & Vargas, 2009), who was a proponent of the blank slate metaphor of the mind (Orians, 2010). Further, it would be an advantage to consider the vital importance that E.O.Wilson places on the arts in his vision for the future of the academia and notably in his vision for the modernisation and

revitalisation of the liberal arts (E.O.Wilson, 1998, 2013, 2014a, 2014b; E.O.Wilson & Haas, 2014). In addition, it is noteworthy that the consilience world view is becoming popular as can be seen in new disciplines, such as the rapidly developing field of evolutionary psychology (Orians, 2010), evolutionary anthropology, and evolutionary religious studies (Slingerland & Collard, 2012; Wilson & Green, 2012; Wilson et al., 2014). There is much to be said for the power of openness to empirical evidence from both camps that has generated an easing of tensions. For example, Davis and colleagues' (2000) called for postmodernist education professionals to recognise the advances in cognitive sciences that support the evolutionary model for culture and the mind, and advocate a détente in the form of one aspect of “ecological postmodernism” (Kindle location 3489). Furthermore, cognitive researchers have realised that the models of social constructivism and behaviourism, particularly in the learning of languages, have much to offer in gaining a full understanding of how the mind works and how learning occurs (E.O.Wilson & Vargas, 2009; Slingerland & Collard, 2012; Pinker, 2012; Wilson & Green, 2012; Wilson et al., 2014).

In the following passages I elaborate on the nature of the controversy surrounding Wilson's stance in relation to the humanities. I begin with an overview of his most controversial work *Sociobiology: a new synthesis* published in 1975. Following on from this I give précis of the nature of the criticism of *Consilience: the unity of knowledge* published in 1998. Then, I point out the areas in which common ground has been found between the behaviourist model for teaching and learning of languages and Chomsky's universal grammar.

Criticisms Relating to Sociobiology

E.O.Wilson is still associated with the controversy surrounding his book *Sociobiology: the new synthesis* published in 1975 (see Riccetti's Foreword to *The Poetic Species*, 2014 by Wilson and Haas; Slingerland & Collard, 2012; Wilson et al., 2014). Further, some behavioural evolutionary biologists do not use the term *sociobiology* to avoid the association with the controversy (E.O.Wilson & Wilson, 2007). For E.O.Wilson (1975) his concept of sociobiology was “the systematic study of the biological basis of all social behaviour of animals” (p.26). Only one chapter dealt with humans and it was that which engendered the brunt of the criticism (Seegerstrale, 2000).

The bulk of the objection to Wilson's notion of sociobiology stemmed from two causes. First, he advocated a genetically determined human nature (Seegerstrale, 2000; Jung, 2002; Pinker,

2002; Wilson, 1975, 1994, 1998, 2012; E.O.Wilson & Wilson, D.S., 2007; Naour, 2009; Orians, 2010; Wilson et al., 2014; Wilson & Haas, 2015; Riccetti, 2014; Slingerland & Collard, 2012). Second, E.O.Wilson desired to be politically provocative without understanding the political and social climate of the time (E.O.Wilson, 1994; Segerstrale, 2000). In the following passages I briefly review those two causes.

It was the fear of many on the political left that a genetically determined human nature would lead to predetermination and discrimination. The view that the mind is (metaphorically speaking) a blank slate (Orians, 2010) offered an approach of fairness giving each individual the possibility to become whatever they wished (Singer, 1999; Pinker, 2002). It also gave supremacy to the social disciplines and an effective barrier to a biological interpretation of human behaviour. Further, it was assumed by the political right that Darwinism endorsed a competitive market place as natural – and the political left believed them. Singer (1999) believes this was because of limitations in Darwinian thinking of the time. Singer (1999, p. 19, citing John Maynard Smith) pointed out that the role of cooperation in enhancing survival and reproductive success was “largely ignored” until the 1960s. Chomsky (cited in Segerstrale, 2000) argued that it is “neither logically necessary nor historically true that a ‘hereditarian’ position should be associated with conservatism and an ‘environmentalist’ one with progressive thought” (p.203). Nevertheless, Chomsky saw it was an advantage for the left to argue for a relatively fixed human nature since asserting that an infinitely malleable human nature would mean that it could be manipulated to legitimise any oppressive regime (Chomsky, 1975; see also Pinker, 2002).

Furthermore, many of Wilson’s observations about humanity were interpreted as supporting the status quo regarding the status of women, war, xenophobia, and aggression (see Rosenthale, 1977; Segerstrale, 2000). As an example, Wilson (1975) argued that although aggression was not universal it appeared to be adaptive; that is, it increased fitness in times of stress such as in certain population densities and under certain social conditions. Wilson also proposed that aggression could be phased out by managing human populations and reforming society. However, he noted that phasing out of aggression may well increase happiness but reduce fitness. Such an argument is comparable to Darwin’s (1871, p. 169) discussion in *The Descent of Man* of the practice of elimination of weaker individuals in a population to enhance fitness of the group. Darwin was careful to note that applying such practices of

animal husbandry to our species would result in a “deterioration of the noblest part of our nature” (p.187).

E.O.Wilson argued in response to criticism that critics had fallen into the naturalistic fallacy trap of ethics that assumes that what is, should be (see Singer, 1999). That is, genetically determined human behaviours evolved in an ancient time incongruent with the present and the future. Wilson argues that to try to encourage these ancient behavioural tendencies because they were adaptive in the past now it would “invite disaster” (Wilson, 1975b, cited in Segerstrale, 2000, p. 25). At that time, those supporting an evolved human nature were frequently and unfairly accused of being associated with the social Darwinism of Herbert Spencer (Wright, 1996) which represented a justification for social inequality (Leonard, 2009).

In his autobiography *Naturalist* (1994), Wilson admitted that his Chapter 27 of *Sociobiology* was intended to be provocative. He also confessed that on hindsight he was politically naïve and by no means an intellectual in the European tradition. In this sense he was ignorant of the arts and the political climate he was working in at Harvard University in the 1970s where the “environmentalist/culturalist” paradigm was dominant in academia (Segerstrale, 2000 p.30).

In summary, sociobiology asserts the existence of human universals; that is, essentialism. The central issue in the controversy is that genes override free will; that is, genetic determinism. Any field of study that disputes a universal and genetically determined human nature will find itself in opposition to E.O.Wilson’s theory of consilience and Darwin’s (1859) view of the natural selection of instinctive behaviour on which E.O.Wilson’s view is founded (see E.O.Wilson, 2012). These opposing views can be grouped into the SSSM (Tooby & Cosmides, 1992 ; Pinker, 2002) that includes disciplines such as, postmodern philosophy, Marxism, hermeneutics, social constructionism (Jung, 2002). By and large it is not those in the humanities who disagree that the human brain formed as a result of evolutionary history; they, not unlike “proponents of consilience”, would however disagree with the extent that genetic history influences our thinking and acting and culture today (see Slingerland & Collard, 2012 p. 29).

Criticisms Relating to E.O.Wilson's (1998) Conception of Consilience

Criticisms of E.O.Wilson's notion of consilience are by and large the same as those levelled against the project of sociobiology, which sparked controversy in both the sciences and the humanities. I begin with key criticism from sciences followed by the criticisms by the humanities.

Consilience was criticised in the sciences for the following reasons. First, it was perceived as an over emphasis of reductionism (Gould, 2003; Slingerland & Collard, 2012). Second, E.O.Wilson's use of the term consilience was considered unconventional (Gould, 2003; Carey, 2013; Pigliucci, 2012). Third, Pigliucci (2012) regarded E.O.Wilson's consilient world view as an over simplification of reality. Next, there are arguments from neuroscience that support a blank slate view of the mind contradicting Wilson's consilient or evolutionary psychological view. The perspective from neuroscience suggests that adaptive capacities in the brain for specific conditions may be unlikely if the brain evolved in a way that it had an open ended capacity; that is, rather than having an adapted mind, our minds are endlessly adaptable (Orians, 2010; Wilson, 2012; Pigliucci, & Kaplans, 2006). Consilience was criticised in the humanities for a number of reasons. The attempt to annex the humanities into the biological sciences was not supported (Pigliucci, 2012; Slingerland and Collard, 2012; Pinker, 2012; Marcous, 2014) and Marcous (2014) argues that E.O.Wilson's (1998) world view neglects the role of political, mental, misogynist, social, and normative bias in the production of scientific knowledge. Marcous (2014) accuses E.O.Wilson of raising science to a quasireligious status beyond reproach from any other domain other than science itself; all other domains are not legitimate or qualified to scrutinise consilience.

Détente

Both consilience and the postmodern have, it seems the betterment of humanity at heart by subverting the worst of human nature. In 2002 Jung (2002) argues that postmodernism targets any form of absolutism; it is antifoundationist and against human nature as a fixed set of traits, and therefore in this sense, the postmodernism approach could be considered an attempt to subvert the notion of human nature by making it impossible to pin down. Similarly, E.O.Wilson's (1998) notion of consilience seeks to identify those evolved facets of human nature that lead to behaviour that is detrimental to the planet (Wilson, E.O. 1998,

2014). Through consilience E.O.Wilson (1998) argues that we can rise above these compartments, if we can first acknowledge their existence.

E.O.Wilson's view seems to be in accord with Davis et al., (2000) who advise that the evidence for a universal human nature is undeniable and should not be ignored. In this way, the empirical reality of the influence of biology on human behaviour can be incorporated into the postmodern in what has been termed the *ecological postmodern* (Davis et al., 2000 Kindle location 3490).

The ecological postmodern acknowledges the contribution of both the cultural, biological and complexity in shaping humanity (Davis et al., 2000). This resonates with the call for humanists to pay attention to the discoveries in the sciences and in particular from the cognitive sciences (Pinker, 2012; Slingerland & Collard, 2012) that Pinker (2012) regards as a cause of the general perception that the humanities are in decline. In this way the ecological postmodern echoes some of the goals of what Slingerland and Collard (2012) have called the "second wave of consilience" (p. 23). This essentially involves the scientific study of human level truths drawing upon humanistic expertise without over estimating the limits of science to grasp all reality.

In addition, as part of a "two-way dynamic" of gene-culture co-evolution (Slingerland & Collard, 2012 p. 31), just as the social-constructionists are obliged to accept evidence for the role played by biology in cultural development, so it is that biologists should yield to the evidence of the role of culture in human evolution and behaviour. Slingerland and Collard (2012) have proposed a "second wave" of consilience that is a proponent of "gene-culture co-evolution". They argue that this is necessary to make a break from the rigidity of E.O.Wilson's sociobiology that saw culture as a direct reflection of the evolved brain as embodied in his metaphor of the mind as an exposed negative waiting to be developed (Wilson, E.O., 1975 p. 156). I think that it may be premature to announce a second wave given that the central concept of gene-culture co-evolution feature presented by E.O.Wilson (1998) through the concept of epigenetic rules which are socially malleability (Wilson, E.O., 1998). Further many of the notions about the origins of prosociality are covered by E.O.Wilson (2012).

Of note is the role that cultural evolution has led to larger brain size, wider linguistic skills and eusociality (Blackmore, 2000; Henrich & McElreath, 2007; Wilson, 2012). Furthermore,

détente has also come in the form of an easing of the “theoretical entrenchment” (Christiansen & Chater, 2015 p. 1) between the behaviourist models of language acquisition, where the mind was considered a blank slate on to which language was acquired through memorization (Pinker, 2002, 2012; Naour, 2009; Wilson, 2012; Slingerland & Collard, 2012; Davis et al., 2000), and Chomsky’s (1969) universal grammar, whereby language was regarded as genetically determined and generative, analogous to the development of an organ (Christiansen & Chater, 2015).

The reconciliation involves the recognition of the key role of culture in the development of language and in language learning. Although there are adaptations to the production of speech, language acquisition is more likely due to a mechanism of recursion whereby an infinite number of combinations of language units can be produced from a finite number of elements (Hauser, Chomsky & Fitch, 2002), than to an inherited language faculty (Christiansen & Chater, 2015 p. 1; Wilson, E.O., 2012). Hauser et al., (2002) argued that the recursion capacity may have evolved for reasons other than language. Evidence suggests that the development of “complex sequence learning skills” for purposes other than language have been commandeered for language (Christiansen & Chater, 2015 p. 11). The language faculty may be largely the foundational elements that make recursion possible. In other words, the genetic basis for language probably evolved before language itself (Christiansen & Chater, 2015). Christiansen and Chater (2015) argue that language is best seen as a cultural rather than biological phenomenon, and E.O.Wilson (2012) is in agreement with this stance. He considers the cultural nature of language could explain the diversity, flexibility and immense creativity of humanity, such that, the failure of natural selection to create an independent universal grammar has played a major role in the diversification of culture and, from that flexibility and potential inventiveness, the flowering of human genius” (p. 235). And in *this regard* E.O.Wilson (2012) is accord with Dancygier (2012), who argues that an evolutionary view of literature is insufficient to explain the creativity that comes from the interaction of cognition and literary forms.

The debate between behaviourism and genetic determinism has had an impact on language instruction and appears to have reached a pragmatic détente. In Chapter 4, I outline this controversy and the development of the language teaching approach adopted by *The New Zealand Curriculum*. I do this to add to the teaching and learning context into which the consilience Unit of Work was introduced into the senior French language class at School #2.

Consilience as Congruence

Mindful of E.O.Wilson's aspirations and criticism, Wilson (2012) argued that E.O.Wilson's notion of consilience could be reconsidered as consistency among the disciplines. This he suggests could be better served by the word "congruence". *Congruence*, he argues, can be achieved by approaching all cultural phenomena from an evolutionary perspective.

Wilson et al., (2014) give examples of the close congruence between the principles of group behaviour as found in the disciplines of evolutionary theory, political theory, and notably for education, in classroom behaviour management (see Wilson, Kaufman & Purdy, 2011; Nolan, Houlihan, Wanzek & Jenson, 2014). In these cross cultural and cross scalar instances, good behaviour is enhanced and becomes a cultural norm through group competition to exhibit good behaviour through a system of rewards and punishments.

Consilience and Grace

Bateson (1972) argues that steps to resolving the anthropogenic causes of the global environmental crisis could be through what he referred to as "grace" (p. 11) (see Charlton, 2008) (see Chapter 1):

Grace is the state of seeing oneself as co-evolved with one another and Nature, as embedded in nested holarchy of complex systems, the pursuit of patterns in nature across the disciplines, and when one engages emotionally in the experience and production of beauty through art (Bateson, 1972; Charlton, 2008).

In the following passages I indicate how E.O.Wilson's (1998) notion of consilience and Wilson's (2012) notion congruence may overlap with the notion of Bateson's (1972) of grace. As mentioned in Chapter 1 the motivation for making this link is to build up to an explanation of curriculum grace whereby the notions of consilience and congruence are applied to the teaching of languages.

First, Wilson's (2012) approach to consilience as congruence appears to resonate with the recognition and exploration of biological patterns in social phenomena. Further, congruence is reminiscent of Bateson's (1979) pursuit of the pattern that connects all living things. Bateson said that it takes the eye of an artist to see the pattern that connects all living things across all scales; looking for shapes, patterns and relations (Volk, 1995). Bateson (1979)

gives the example of homology in anatomy within individual organisms, such as between the claws and appendages of a crab; between species, such as between a crab and a lobster, a man and a horse; and, between the individual organism and species over all. Bateson (1979) referred to the comparison of patterns between the organism and the species and so on, as the pursuit of patterns of patterns, which he called “metapatterns” (p. 12). Bateson also sought patterns beyond comparative biology (Volk, 1995). Volk (1995) further developed Bateson’s metapattern concept to general patterns that apply across biology, culture, and cognition (Volk, Bloom & Richards, 2007). Of note for this thesis in education, and for this discussion of congruence, is the overlap between biological evolution and learning as noted by Bateson (1979) and Volk (1995) that both education and learning can be generalised in terms of the metapattern of the goal directed cycle. Furthermore, both evolution and learning utilise the metapattern of variation and selection (Volk, 1995 p. vii). Volk et al., (2007) considered their concept of metapatterns as a contribution to the development of a unified body of knowledge or consilience (p. 1078).

Wilson (1998), agreed that Bateson’s (1979) and Volk’s (1995) metapatterns were underlying patterns or abstractions of complex reality and saw them principally in relation to their role in the identification of complex objects. To recapitulate, the quest for congruence (after Wilson, D.S., 2012) resonates with the pursuit of metapatterns (after Bateson, 1979; Volk et al., 2007) both of which contribute to the project of the unification of knowledge or consilience, as defined by E.O.Wilson (1998). In so doing to it is arguable that consilience, through its interest in connecting patterns, could be considered to constitute a step towards grace.

Second, E.O.Wilson (1998) refutes all beliefs that see humanity as godlike and argues for the recognition of, and a keen understanding of, evolutionary origins of human nature. Similarly, for Bateson humanity as not readymade, but rather co-evolved with Nature.

Third, E.O.Wilson (1998) asserts that human interest in the creative arts is an indicator of genetically determined, yet malleable, predispositions that collectively define our human nature; that is, “epigenetic rules”. Similarly, Bateson argued for an engagement in a felt aesthetic experience of art whereby we would experience our co-evolved nature with the *other*.

The fourth element in Bateson’s approach to grace is to see Nature as comprised of, and nested within, countless complex systems. E.O.Wilson (1998), however, understands the

principles of complexity theory and appreciates its goals to find key algorithms that will explain the development of the simple to the complex. He also states that at the time of the writing *Consilience*, his heart was not with those who pursue those objectives (p. 96). He states plainly that he considered complexity thinking to be inchoate, too much metaphor and without novelty. Rather, he puts his faith in a reductionist approach to unravel the models of development from cell to complex organism which he compares to a “machine” (p. 99).

As indicated in Chapter 1, panarchy is central to the case study theoretical framework data analysis. In this way I utilise D.S.Wilson’s (2012) take on E.O. Wilson’s notion of consilience as congruence to make theoretical and metaphorical connections between ecology and teaching and learning.

Summary

D.S.Wilson (2012), Slingerland and Collard (2012) and other commentators have suggested that there are three versions of consilience.

- a. The process of abstraction of inductions that follow from Whewell (1847)
- b. A sociobiological explanation culture that follows from E.O. Wilson (1998)
- c. The need for congruence between the disciplines that follows from D.S.Wilson (2012), which itself overlaps with the spirit of the second wave of consilience, as described by Slingerland and Collard (2012).

I have detailed the etymology and origin of the notion of *consilience*, as a jumping together, in contrast to *resilience* which means a jumping back. I discussed the way in which consilience was first developed by Whewell, the nineteenth century philosopher of science, as comparable to a genealogical table of ideas that runs in reverse. That is, where evolution involves the divergence of one entity into many, consilience relates to the convergence of many entities or ideas into one.

In general, E.O.Wilson's (1998, 2014) project of consilience is an attempt to subsume humanities into a coherent and materialist body of thought. E.O.Wilson’s attempts to define human nature is directed at showing us what we are like, and in so doing, empowering us to neutralise those deleterious behaviours that have engendered the environmental crisis but without compromising what makes us most human (E.O.Wilson, 1998, 2014).

E.O.Wilson's notion of consilience is related to his earlier concept of sociobiology. One of the central tenets of both sociobiology and consilience is the identification of a largely genetically determined, yet malleable, human nature; in other words, the mind is not a blank slate in this world view. The proposition that the mind is not a blank slate engenders opposition from those disciplines in the humanities that dispute this, such as postmodernism and behaviourism, but reconciliation may be possible through two means. First, when there is openness to the evidence that neither polarised view has a monopoly on the truth, so to speak. Second, when one sees consilience and postmodernism as competing methods aimed at the same goal - the neutralisation of the worst that mankind can be.

In this chapter I suggested that the seeking of biological patterns in cultural phenomena in the form of congruence could conform to the pursuit of "the patterns that connect" after Bateson (1979 p. 11), Volk (1995) and Volk et al., (2007). I also suggested that the pursuit of such patterns could be added to the notions of congruence and the second wave of consilience.

I have also proposed that:

- a) the pursuit of unifying patterns between disciplines in concert with:
 - b) involvement in the arts as a driving force for making connections
 - c) an evolutionary interpretation of humanity and human culture, and
 - d) the perception that the individual is comprised of and nested within complex systems,
- could constitute an approach to evolutionary wisdom or grace after Bateson (1972).

As illustrative of the principle of congruence it is noteworthy that under both constructivist and memetic theories of knowledge creation whenever an idea is replicated it is modified by the receiver's experience and becomes a variant (Davis et al., 2000; Wilson, D.S. et al., 2014). In this vein, it is at the same time paradoxical, but consistent with both views of idea development, that consilience, a concept that unifies ideas, should be split into at least three nuanced meanings.

And finally, given that consilience could be seen as an approach to grace, the inclusion of consilience in the context of *The New Zealand Curriculum* could generate an opportunity for what I have referred to as curriculum grace. This amounts to the pursuit of biological patterns in culture, and vice versa, as well as evolutionary psychological explanations for culture as a means to approach the fulfilment of the Principle of Coherence (see Chapter 1).

In the following chapter, I develop the idea of curriculum grace through consilience in two ways. First, I propose the adaptive change cycle and panarchy as a metaphorical pattern that connects ecology to teaching and learning. I do this to develop a metaphoric vocabulary to consider and to interpret the development of student ideas as ecosystem change. Second, I submit an approach to curriculum grace through consilience in the context of integrated task based language learning in senior secondary school context in New Zealand.

CHAPTER 3

TOWARDS A THEORETICAL FRAMEWORK

Every response, whether it be an act directed towards the outside world or an act internalized as thought, takes the form of an adaptation or, better, of a re-adaptation. (Piaget, 1950 p. 4)

...there exist great parallelism, and a fairly close one, between the great biological doctrines of evolutionary variation (and therefore of adaptation) and the particular theories of intelligence as a psychological fact.... so much so that ...there may be a simple convergence of solution and so the latter may confirm the former. (Piaget, 1950 p. 12)

In this chapter, I develop a theoretical framework based on the ideas of consilience described in Chapter 2, through which to interpret the teaching and learning process. This interpretation underpins the analysis of the case study data at School #1.

The adaptive change cycle (ACC) for ecological change may be a useful metaphor to understand the process of learning. In the first major part of this chapter, I offer a description of the four main phases of the ACC. I include descriptions of interchange between ACCs of varying scales in what is known as a *panarchy* (Holling, 1995; Gunderson et al., 2001, 2002).

As I progress I provide metaphorical equivalents with the learning process. In the second part of the chapter, I detail the three axes of the adaptive change cycle, connectedness (x-axis), potential (y-axis), and resilience (z-axis), as they relate to ecosystem change and metaphorically to the learning process.

The Adaptive Change Cycle (ACC)

The ACC is three dimensional. The y-axis denotes capacity/potential for change. The x-axis denotes connectedness of abiotic and biotic elements within the system. The z-axis denotes the cycles resilience to resist system shocks (see Figure 3.1). The model is composed of four phases. In a fire prone forest ecosystem the conservation state (K) could be the mature climax forest ecosystem. With a spark or lightning strike that starts a forest fire the system temporarily collapses losing connectivity with a release of stored energy/tension and falls to the release state (Ω). At this point the system moves toward system thermodynamic equilibrium, a state of high entropy. This phase is followed by the reorganisation state (α) where connections are rearranged and re-established, before the system reaches the exploitation state (r). Here, new entities emerge in great number and respond to the rapidly changing conditions which requires adaptation and change (Holling, 1995) (Figure 3.1).

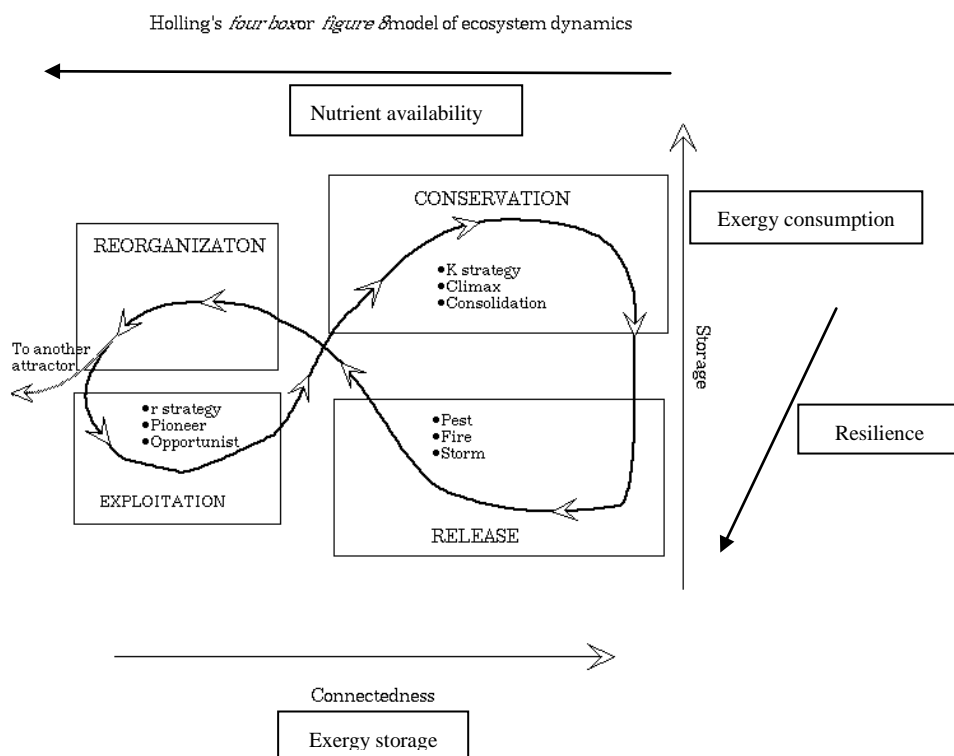


Figure 3.1 Holling's model of adaptive change cycle (ACC) also known as the four box figure 8 model of ecosystem dynamics after Holling (1995), Holling and Sanderson (1995), Holling (2001), Kay (2000), Gunderson, Holling and Peterson (2002).

In the following passages I elaborate each element of the ACC and its possible analogue to the teaching and learning process.

Conservation or K-Phase

In the example described the conservation phase is the mature forest ecosystem. It is characterised with species: that occupy stable environments, have a long life span and in extreme cases tend to reach their maximum age before dying. They have a small number of offspring and require specific conditions (Holling, 1995). Such species live near the carrying capacity K of a sigmoid population growth curve and are known *K-selected* (see MacArthur & E.O.Wilson, 1967; Krebs, 2000). K -selected organisms may require a stable environment and the presence of other species in which to flourish. In a forest developing toward climax, some species may not be able to survive in an environment that is devoid of early colonising species that have prepared the terrain.

In the metaphor with learning, K -selected ideas are well established ideas. Under the constructivist paradigm, ideas are built on extant ideas, and creativity is the product of connecting existing ideas and creating new ones (Sfard, 1998). The K -selected species could be analogous to ideas that have, as their foundation, other ideas that have been acquired in terms of the acquisition learning metaphor (AM) or experienced for the participation metaphor (PM) (see Sfard, 1998), and on which the new idea has been drawn. K -selected ideas can only appear through an accumulation of experience through study for example (see Table 3.1).

The Conservation (K) phase is also characterised by system rigidity, and brittleness because of high connectedness (Holling, 2001; Gunderson et al., 2002). The system at this stage is also highly predictable and remains on a single trajectory. Resources are bound up by vegetation that exclude their competitors. In social systems there is a loss of flexibility due to reliance on past successes. The system becomes too set in its ways and the players do not see a need to change. This scenario is a recipe for collapse when change arrives (Holling, 2001; Gunderson et al., 2002).

Rigidity trap.

When the adaptive change cycle becomes blocked at the K -phase with high connectedness, with high levels of stored capital or potential and high resilience at a time when change is

vital, the system is considered maladaptive and has entered a *rigidity trap* (Holling et al., 2001; Kindle location 2065; Butler & Goldstein, 2010).

The rigidity trap occurs in managed natural systems such as forests and national parks (see Holling et al., 2001; Gunderson et al., 2002; Butler & Goldstein, 2010) and administrative systems such as large bureaucracies that maintain a status quo with a resistance to innovation (Miller 1993, Holling et al. 2001). The Hindu caste system is an example of a rigidity trap in social systems where strict social rules prevent interaction with others of differing social groups (Berkes & Folke, 2001) block idea exchange. In other words there is resistance or mechanisms in place to prevent the system entering the collapse or release (Ω) phase. In forest management this equates to resistance to changing fire suppression policy (Holling, 2001; Gunderson et al., 2002; Butler & Goldstein, 2010). Conifer forests in Yellowstone National Park require fire for seed dispersal and germination because certain conifers will only release their seeds from cones when exposed to extreme heat, and germination is enhanced through the rapid release of nutrients that results from a forest fire (Leopold et al., 1963 in NPS, 2004; Franke, 2000; Campbell & Reece, 2005).

The rigidity trap in the ACC could have its metaphorical equivalent in rigid thinking which has clear overlap with the learning process. Rigid thinking is an uncreative mind set (Gaither et al., 2015). For Guilford (1967 cited in Kline, 2000), rigid thinking amounts to staidness in approaching a problem, conservatism, obstinacy, an inability to adapt to changing conditions, an unwillingness to see a situation from another's perspective and a general lack of creativeness. Kline (2000) points out that mental rigidity is both a psychiatric condition related to bipolarism, and a personality trait involving authoritarianism, obsession, conservativeness, conventional intolerance of ambiguity, and ethnocentrism. The triggering of certain social identities can bring about mental inflexibility and this can affect social behaviour including academic achievement (see Aronson, Steele, Salinas, & Lustina, 1998 for the effect of stereotypes). In contrast, Gaither et al. (2015) have shown that that mental flexibility and creativity can be enhanced when individuals are reminded that their identities are not limited, but fluid and that individuals have multiple identities.

Release or Ω -Phase

With the advent of a disturbance event such as a pest outbreak or a lightning strike, the mature forest ecosystem temporarily collapses losing connectivity with a release of stored

energy and falls to the release state or Ω -phase (Holling, 1995) (see Figure 3.1). At this point the system has low entropy and is close to system equilibrium or a state of death (Kay, 2000).

A lightning strike in a fire prone forest is analogous to events that may or may not trigger the beginning of a transformative learning experience (Ayers, 2006; Stanger et al., 2013). Such experiences are widely discussed in education literature and given a variety of concepts with their own terminology.

For Stanger et al., (2013) release is a stochastic event which could expose the learner to a new paradigm (p. 10). This could lead to transformation of spirit and mind (Senge, 2000), referred also to as *deep learning* (Li (2002) resulting in a change in self-image in relation to the world (Clark, 1992); that is, a shift from what we know to how we know (Kegan, 2000). Mezirow (cited in Illeris, 2002) calls this metaphorical as spark a moment of social responsibility (p. 58). In Dewey's phases of reflective learning it is the indeterminate situation (Dewey cited in Miettinen, 2000). In the experience based-learning model (EBL) of Kolb et al., (1971) the analogue of release may be the concrete experience (CE) where the learner becomes open to new ideas through experiences. The trigger may be a pressing problem that cannot be solved with existing alternatives (Illeris, 2002). Engestrom (1987 p. 153) refers to such events as a personal crisis, a breaking away, a turning point, or a moment of revelation. Such an event is seen as the equivalent of Piaget's "accommodation event" or "learning jump" (Illeris, 2002 p. 164), where an assimilated pattern is no longer useful or appropriate and a habit is broken. Such a moment could be compared to the critical situation in the sequential wave model of learning developed by Berg et al., (1976 cited in Illeris, 2002).

Revolt and remember.

The ACC is a nested holon and is open to influence from other cycles, larger or smaller that are found around and within it. In general the cycle receives input from the exterior larger slower cycles at the exploitation or α -phase in a process called *remember*. The ACC influences larger slower cycles from the collapse (or Ω -phase) that reverberate upwards in a process termed *revolt* (Holling, Gunderson, & Peterson, 2002) (see Figure 3.2).

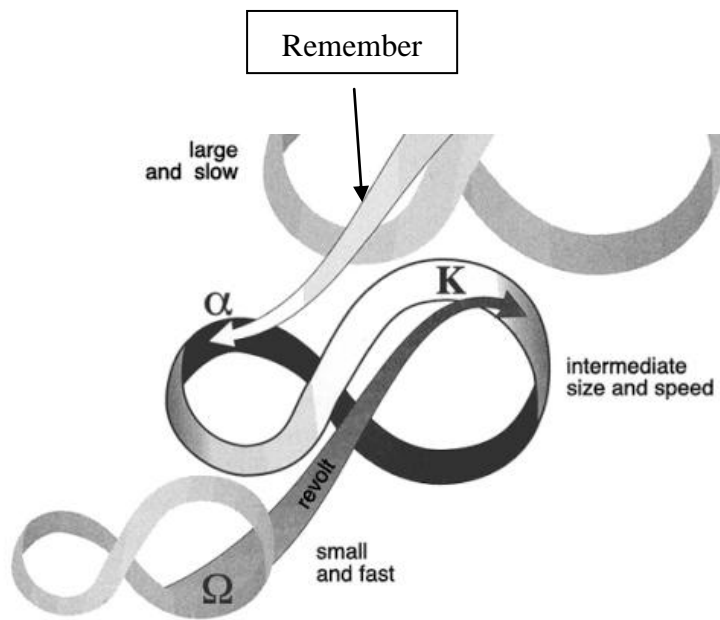


Figure 3.2 Panarchical connections (adapted from Holling et al., 2002 p. 75)

Revolt.

Collapse in a lower adaptive change cycle can catalyse a cascade upwards to a slower adaptive change cycle if that slower cycle is in the conservation (K) stage where there is low resilience, high connectedness, and potential for collapse/change (see Figure 3.2). In other words, when there is accumulated rigidity, a collapse in a smaller, faster adaptive change cycle at a lower scale may generate revolt (Holling, 2001). Revolt brings down the slower cycle above it, and is readily illustrated in a forest fire, where a fire in a single tree spreads to the entire forest.

In a classroom, revolt could be in the form of a learner's epiphany. This could be transformed into a joke told to a classmate that is overheard by the class resulting in general laughter. This laughter could cause the teacher to rethink a position, and result the collapse of that position. The rapid spread of an idea throughout a panarchy could constitute an example of positive feedback (Holling, 2001; Holling, Gunderson, & Peterson, 2002). From the point of view of ecological panarchy, revolt is an integral and necessary part of the overall ecosystem. The destruction of one tree is necessary to bring the entire forest down. Ultimately collapse is vital for adaptation and survival and continuance of life (Holling, 2001; Holling, Gunderson, & Peterson, 2002).

When carried over into the classroom the metaphor of ecosystem revolt may also be seen as positive and a vital force for creative change, and adaptation. The natural destruction of a forest ecosystem during a fire is a creative event necessary for the ecosystem to maintain

health and adaptability. This notion is encapsulated by the saying, “a single spark can start a prairie fire” (Ayers, 2006 p. 17). For Ayers, the prairie fire is a potent metaphor for the transformative teaching and learning experience, and the fire is not necessarily catastrophic. Fires stimulate new growth by removing the dense thatch that inhibits seed germination. Once removed, birds, insects, and the other animals are drawn to the site, leading to a reconstitution of communities. Ayers remarks that the metaphor is a close match to the teaching experience because in the learning context of the classroom a metaphorical spark may clear away redundant or false ideas and open up greater learning possibilities or sites for newly connected ideas to emerge. Ayers (2006) remarks that the student response to stimulus is also unpredictable that “there is simply no way to predict with any certainty which spark will come to nothing, and which might just start that prairie fire” (p. 17).

The message from Holling (2001) is that periods of revolt and collapse are expected and necessary. The role of both ecological and classroom managers and the managers of the education systems is therefore to anticipate periods of revolt, to recognise them, to work with them, and to control them to minimise unnecessary damage and pain.

Creative destruction and renewal ($\Omega \rightarrow \alpha$).

The idea that new knowledge germinates in old knowledge has been promoted by all theoreticians of intellectual development from Piaget to Vygotsky to contemporary cognitive scientists (Sfard, 1998 p. 4).

As the ACC begins to recover from disturbance it enters the phase of creative destruction and renewal (Holling, 2001). That is the system passes from release (Ω) to reorganisation (α). This period is characterised by rapid reorganisation, novel and unpredictable recombinations. These new elements lead to innovation which is exploited in the growth phase (r to K) (Holling, 2001) (see Figure 3.3).

In the context of the classroom, collapse generates a moment of disorientation where connections to certain constructs or ideas are questioned, and there is a momentary level playing field where ideas are reshuffled. This phase provides opportunities to use the new entrants that arrive through transient windows of opportunities (Holling, 2001). The new entrants at the level an organism are mutant genes, new organisms in the form of invading species, and at the ecosystem level they may be exotic species or species that are waiting for

appropriate conditions. For example in economies the new entrants are inventions, creative individuals, and new ideas. This stage is typically slow and entails time to allow for a build-up of new elements. There is then a short period for rearrangements. In the classroom, new entrants may take the form of ideas derived from learner memory, from the memory and created from discussions with peers, the teacher, and texts and so on. This input of ideas is discussed in the next subsection and is referred to as remember (see Figure 3.2); the reorganisation phase is shown in Figure 3.3.

Holling's four-boxor figure 8 model of ecosystem dynamics

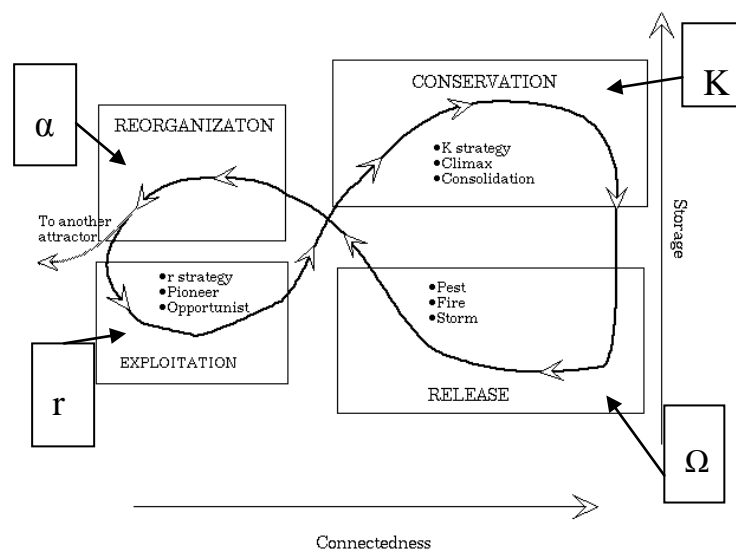


Figure 3.3 Release or collapse to Reorganisation (Ω to α) period of the ACC (modified from Holling, 2001).

During the reorganisation phase (Figure 3.3) in the classroom, students may become self-conscious, as certain ideas including themselves are drawn into question, and put into its social and historic context (cf Davis, et al., 2008 p. 102). Learners may experience being momentarily confused and overwhelmed or stuck, which is reminiscent of the liminal phase of the learning of threshold concepts (see Meyer & Land, 2006). At this moment the learner is, as it were, poised between moments of understanding and periods of confusion. Students may feign understanding through mimicry, learning by rote or learning to solve typical problems (Peterson, 2011).

From a complex systems point of view of the natural environmental, those conditions that enable and determine the self-organisation or establishment of a certain ecosystem type are

referred to as “attractors” (Kay, 2000, p. 1). Within the concept of the attractor is included the suite of conditions around which the system can reform after destruction, and an ecosystem has a number of possible attractors and may shift between them (Hobbs & Norton, 1997; Kay, 1999; Gunderson & Holling, 2002). The reorganisation phase is the space from which this shift can occur (Figure 3.3). In terms of the metaphor of the ecosystem as learner, the reorganisation phase could be a place where students may be drawn into other values and belief systems radically different from their own; that is, to another attractor (see Kay, 2000; Holling, 2001) around which they will develop (see Figure 3.3).

Remember.

When an ecosystem, such as the fire ravaged forest, is in a state of early recovery; that is, as it progresses from $\Omega \rightarrow \alpha$ (Figure 3.3), the physical structure of the terrain, climate, seed bank, pollinators, and seed dispersers and so on, influence the direction and the shape of the recovery. Holling describes this process of drawing on resources from the destroyed previous system, and on material derived from greater and slower cycles as remember. This is because “it is as if this connection draws on the accumulated wisdom and experiences of maturity” (Holling, 2001 p. 76).

Ecological remembering in terms of teaching and learning is taken directly from Holling, 2001s metaphorical language for ecosystems in the above quote. That is, ecosystems reorganise themselves, drawing on accumulated wisdom and experiences of maturity. Similarly in the learning context, during the period or reorganisation, students will draw on knowledge acquired from previous experiences, and also from the guidance of the teacher who in the constructivist classroom is acting as guide and facilitator, and who calls on their own knowledge and experiences to support learning (Figure 3.2).

Stanger et al., (2013) have also used the ACC as a means of mapping learner progress very much in parallel with this suggested development of it as a theoretical framework. They interpret the concept of remember as the student recalling information delivered during teacher centred undergraduate lectures. These structures are utilised in the concretisation of the student’s epiphany. Remember, as it is used in the Gunderson et al., (2002) metaphor, may also relate to experiences within a constructivist approach, Project Based Learning (PBL) and issues driven integrated learning as defined by Fraser (2000 p. 21). Under these practices, learners draw on their collective experiences in their peer groups and from their

teacher. The teacher performs the role of guide and facilitator and artfully engages in scaffolding to guide the learner (see Fraser, 2000). The learner draws on resources derived from their teacher's store of experiences, knowledge, and wisdom made available to the student as guidelines, feedback, and resources to assist them in recovering from the disturbance event that the teacher may have initiated.

Poverty trap.

When the system remains stuck in the reorganisation phase; that is, in the back loop of the ACC, it is because there is a lack of input from outside the system in terms of legacies and wisdom, in other words, a lack of remembering (Holling, 2001; Gunderson et al., 2002). Here support systems no longer function and cannot provide support to the individual and the group. The individual must become self-reliant in the absence of the resources provided by outside larger systems (Holling, 2001). In the context of an enterprise, a poverty trap emerges when there is a lack of innovation, and therefore a lack of options, which means that no decisions can be made nor action taken. The system cannot enter the growth or exploitation phase, and remains stuck in the back loop (see Figure 3.4).

In the classroom context the poverty trap could emerge because of the teacher putting learners in a situation that is beyond their capacity to assimilate information or the experience to which they are exposed. In other words the teacher is teaching outside the learner's zone of proximal development (ZPD) (Vygotsky, 1978; Tharp & Gallimore, 1998; Gredler, 2011).

As in Nature and society, the failure at a classroom level reverberates downwards through the lower cycles moving from class of students as a whole, to groups of students, to pairs of students, to the individual, and to the self and resulting in the erosion self-esteem. One could expect other emotions of frustration, boredom, and depression which culminate in students giving up on the task.

Exploitation (r)

In the forest fire example once all the organic matter is decomposed and a maximum amount of nutrients released through the processes of decomposition there is a fall in the potential for change, and an increase in the resilience in the face of change. The system is being drawn toward the maximum exploitation of all available resources; that is, the system collapses in

the α -phase being drawn toward the phase of exploitation (r), toward the attractor of maximum useful energy consumption (Kay, 2000; Holling, 2001).

The exploitation phase is marked by the advent of autotrophic organisms, which is able to fix atmospheric carbon; that is, plant life. This is the formation of the back loop of the ACC (see Figure 3.3). Such pioneer species colonise the vacant ground in large numbers. These r-selected species are able to respond to the rapidly changing conditions and are characterised by high reproductive rates and short life spans-selection (Holling, 1995; Holling & Sanderson, 1995). In the proposed metaphor an idea enters the reorganisation stage as an r-selected idea. That is, it is an idea that may have been rapidly conceived. It may be inchoate, not based on knowledge but opinion and is easily dismissed. Such r-selected ideas are numerous and short lived. Heterotrophic collapse could represent a vital turning point in the learner negotiation of meaning; that is, in making sense of an authentic learning experience. That is, learners transition from confusion to the creation of ideas from remaining fragments. The reorganisation phase consists of analysis, comparing, and contrasting of ideas. This is followed by evaluating and then putting the pieces together in novel ways or creating new meanings (Bloom, 1956; Burder et al., 2014). The re-organisation and its development towards heterotrophic collapse and growth phase could be thought of as developing towards higher order thinking as described in Bloom's (1956) taxonomy.

The Three Dimensions of Adaptive Change Cycle

The ACC is comprised of three axes or dimensions: connectedness, potential and resilience (Figure 3.1), all of which shape the ACC and determine how it responds to disturbance (Gunderson et al., 1995 cited in Holling, 2001). In the following passages, I elaborate each of the three dimensions to show both how they relate to ecosystems, and also how this can be extended metaphorically to teaching and learning.

Connectedness

The strength of connections between elements within a system moderates the influences of the outside world (Gunderson & Holling, 2002 loc. 367).

In biological, ecological and economic systems the dimension of connectedness in the ACC refers to the level of connectedness amongst the controlling variables (Gunderson & Holling, 2002). All controlling variables work in synchrony responding in their own way in

coordination with each other to maintain constancy in the face of external changes. In the ACC connectedness is a measure of cohesion between elements in a system (Gunderson & Holling, 2002).

In the analogy of idea formation, connectedness has much in common with consilience and *The New Zealand Curriculum (NZC)* Principle of Coherence which deals with the extent to which ideas from diverse disciplines are meaningfully connected; that is, the degree to which ideas contribute to the creation of an innovative solution to a perplexing problem or disturbance. (MoE, 2007).

Low levels of connectedness are associated with weak links and loose associations between elements. These elements tend to be dominated by outside influences (see Peterson et al., 1998; Gunderson & Holling, 2002). Individual learners are at time of weak connectedness as it were, carried about by every wind of doctrine. In contrast, high levels of connectedness are associated with the inward relations among elements of aggregates where the relationships deal with the effects of external changes (Peterson et al., 1998; Gunderson & Holling, 2002).

Peterson et al., (1998) emphasise that connectedness should be thought of as the strength of feedback mechanisms due to connections with the other. This strength of connections determines how quickly the system will return to a former state after a disturbance; that is, how strong the system can follow its trajectory. Connectedness is thus connections to others and other ideas, as well as the sort of connections that facilitate feedback. Connectedness is, therefore, a function of resilience, a point to which I shall return.

Potential

During the *potential phase* there is the accumulation of capital. In the forest system example it would be the accumulation of leaf litter and other detritus that constitutes fuel for a fire. Furthermore, organic and inorganic material is taken up into the bodies of colonising organisms through growth and reproduction (Holling, 2001). Potential refers to the system's susceptibility to change. In this way, potential is related to the level of connectedness and thus brittleness, as well as the capacity of the system to resist perturbations, contain possibilities, and bounce back expressed as resilience.

In the learner, accumulation of capital could relate to the accumulation of integrated knowledge through experience. Such accumulation is likely to occur through Piaget's (1950)

cyclical model of intelligence as cognitive adaptation to the environment and vice versa through the revision of schemas through the mechanisms of assimilation and accommodation (see Flavell, 1996). Predicated on the earlier work of Claparède (1917), Piaget (1950) referred to this process of continual readaptation as “intelligence” between “the subject and the universe” (p. 7). For Piaget (1950) all human responses whether they are actions or thought were a form of continual adaptation and renewal: “Every response, whether it be an act directed towards the outside world or an act internalized as thought, takes the form of an adaptation or, better, of a re-adaptation” (p. 4). An individual only takes action when the equilibrium between the individual and the environment is upset (Claparède cited in Piaget, 1950). This could be thought of as when there is “a difference that makes a difference” (Bateson 1972 pp. 228-232).

Assimilation involves a state of equilibrium between the individual and the environment. When the subject is confronted with an aspect of the environment, under the behaviour of assimilation, rather than submitting to that element the subject “modifies it by imposing on it a certain structure of its own” (Piaget, 1950 p.8). Piaget goes on to compare the process of assimilation to physiology of digestion whereby an organism absorbs materials making them “compatible with its own substance” (p. 8). Under mental assimilation information is absorbed and modified to conform to existing “structures” or “patterns of behaviour” (Piaget, 1950 p. 8). In contrast, accommodation is where the environment acts on the organism. The effect of the environment is to change itself in respect to the environment as Piaget (1950) wrote, “conversely, the environment acts on the organism and...it being understood that the individual never suffers the impact of surrounding stimuli as such, but they simply modify the assimilatory cycle by accommodating him to themselves (p. 8). As the individual grows and develops, moments of accommodation punctuate the flow of assimilation.

Piaget continues to extend this biological process to the psychological process of learning where the individual does not passively submit to circumstances modifies how they react to them; that is, in Piaget’s (1950) words: ”psychologically...the pressure of circumstances always leads, not to a passive submission to them, but to a simple modification of the action affecting them” (p. 8).

In comparison to the internal changes in the body of an organism, the psychological changes in response to stimuli occur at a greater distance (perception, etc.) and in time (memory, etc.) and following more complex paths, of reversal, detours, and so on (Piaget, 1950 p. 4). It is

conceivable that Piaget's notion of the torturous path of psychological changes could equate to the process of Ω to α to r .

Relatively recent research into the process of accommodation may shed some light on these complex paths that Piaget alludes to. Moskaliuk et al., (2011) attempted to breakdown the process of accommodation into steps of knowledge maturing using Cress and Kimmerle's (2008) coevolution model. The coevolution model is a framework that describes individual and group knowledge maturing based on wikis and so revealed externally or publicly. The coevolution model is based on Piaget model of equilibration.

Accommodation for Piaget was qualitative whereas assimilation was quantitative (Cress & Kimmerle, 2008). In the analysis of texts in the form of wikis, Moskaliuk et al., (2011) consider that accommodation is indicated by qualitative textual changes involving reorganisation and innovation. In contrast, assimilation involves quantitative changes to a text, such as addition of examples and arguments that bolster the message without changing it.

The coevolution model involves four stages (Cress & Kimmerle, 2008; Moskaliuk et al., 2011):

- a) cognitive conflict that incites the process of accommodation, beginning with internalisation of new information,
- b) then integration with existing knowledge
- c) and a period of externalisation of emergent knowledge
- d) followed by development

Stage a) that of cognitive conflict and internalisation could overlap with the phase of release or creative destruction of $K \rightarrow \Omega$. Stage b) that of integration could relate to the phase of release to reorganisation $\Omega \rightarrow \alpha$. Stage c) that of externalisation could occur at the growth phase $\alpha \rightarrow r$. Finally, stage d) development, could represent the beginning of the process of knowledge maturation.

In this thesis the ACC depicts the development of an idea that features in a student's text which in the case study is a two to three minute podcast in French. The ACC that is developed to depict student learning may include smaller ACCs nested within the larger cycle. Progress upwards is made up of incremental learning episodes which could be

assimilatory and in that sense quantitative in accord with (Cress & Kimmerle, 2008), but because large ideas may be composed of smaller ideas, it is conceivable that challenges to existing ideas may occur and engender accommodation events. In ACC terms that would, for example, mean the individual would experience a collapse-reorganisation and a renewal event nested within the text development cycle for the student's podcast. These smaller cycles I refer to as micro-events and they are discussed in Chapter 5 and Chapter 6, the results sections.

Resilience.

In Holling's (2001) model, resilience is represented by the z-axis and is seen when the two-dimensional representation of the ACC is turned as depicted in Figure 3.4 below. As described earlier, resilience refers to the system's capacity to bounce back after sudden or unpredictable disturbance. Resilience answers the question how much change can a system absorb before it becomes another sort of system (Holling, 2001). If the disturbance is beyond the system's resilience, the system may be permanently changed. The system may switch to a different stable state through being drawn away by an alternative attractor (see Figure 3.3). Resilience keeps the adaptive change process on a course as it passes through the four stages maintaining the general type and shape of system (Holling, 2001; Gunderson et al., 2002). This maintenance is through a system cybernetic system or homeostatic of negative feedback. In this context, negative feedback is characterised by oscillation around a goal. An example of this would be the homeostatic control of blood temperature in warm blooded animals (Lovelock, 1979; Ulanowicz, 1997; Kay, 2000; Capra & Luisi, 2014). Through negative feedback, the cybernetic rhythm is embedded into the ACC maintaining the cycle's trajectory through the four phases.

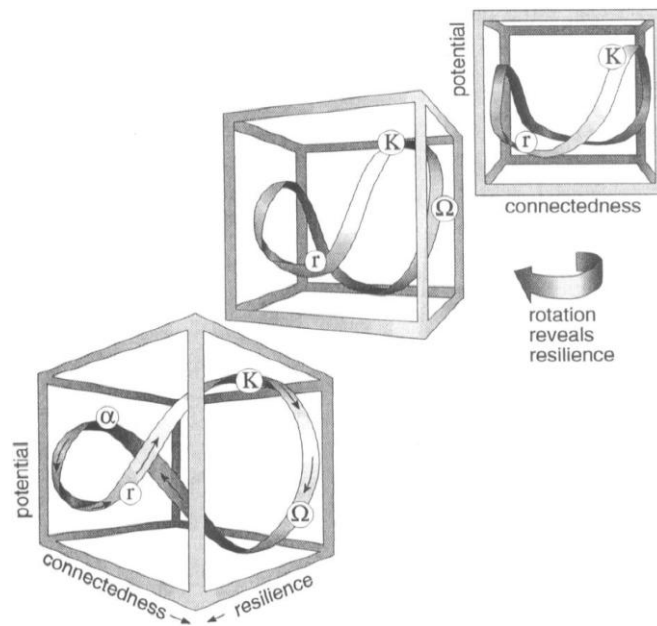


Figure 3.4 Three-dimensional model of the ACC. Resilience is revealed when the model is rotated (Holling, 2001).

Resilience through connectedness includes regulatory mechanisms of feedback that reduce the likelihood of chaotic system behaviour. However, as mentioned earlier in this chapter, these same controlling and stabilising mechanisms can lead to brittleness and rigidity (Gunderson et al., 2002). High connectedness may limit the number of options open to the system and thus restricts the system's freedom to choose. In this way, the level of connectivity can be thought of in terms of the extent to which the links facilitate or inhibit the system's ability to adapt to change, and allow the system to maintain itself autonomously as it progresses through the four phases of ACC. This includes permitting a system to go through a release phase (Holling, 2001) or the beginning of the creative destruction phase (Schumpeter, 1950 cited in Holling, 2001). However, the impact of collapse on the individual can be mitigated through an attitude of openness of the individual and that this attitude should be imbued in the ideas that they create where both the author and the idea are in a state of becoming (see Perkins, 1975). For example, a written idea can be rendered adaptable through the careful use and awareness of the *is* statement which can suggest evidence based certainty when in fact a student expressing an unsubstantiated opinion (Claxton, 2008). Such a position of misplaced certainty can be corrected through the replacement of the *is* statement with a modal verb of certainty such as *could* (Claxton, 2008; Hipkins, 2008). In terms of Piaget's theory of equilibration, through the aforementioned strategies the individual may be able to achieve equilibrium through assimilation of new information and experiences, rather than

having to undergo the process of accommodation. In this way, the student can increase the resilience of an idea or schema.

To reiterate, each phase and dimension of the ACC can be aligned metaphorically with the learning process. The metaphor developed thus far may provide a vocabulary to talk about the learning process as ecological adaptation.

Summary

In the first part of this chapter, I described the four main phases of the adaptive change cycle (ACC) and points of interconnections with other cycles. I provided metaphorical equivalents with the learning process with each of these phases and connections between cycles. I began with the conservation phase (K) in the form of a stable climax forest ecosystem that is a metaphor for a conservative unchallenged mind set. I then described the rigidity trap in social ecological systems where the system may resist change it is vital to its survival (Gunderson et al., 2002). The rigidity trap appears to have overlap with rigid thinking in the field of psychology and adult education (Randle, Stroink & Nelson, 2015; Gaither, Remedios, Sanchez, & Sommers, 2015). I then described the release/ collapse (Ω) phase, using as an example, a major disturbance in the forest ecosystem in the form of a fire. This, I suggested, is metaphorically equivalent to a transformative experience in the learner. At this point I introduced the notion of revolt as the reverberation of a collapse event from one cycle to other, as in the case of a spark spreading to a tree and then to a forest and so on. Revolt, I proposed is the metaphorical equivalent in the classroom of the spread of an idea from one learner to the class as whole. After collapse the system enters the creative destruction or reorganisation (α) phase in the instance as a forest fire as a burnt over terrain. In regards to the learner, this phase could be one of reflection and recovery. In the natural system inputs come in the form of colonising organism propagules such as seeds and spores. In the classroom input could come in the form of feedback from the teacher, peers, and the individual's memory and so on. Just as the system may stall in the form of a rigidity trap at conservation, the system can stall at reorganisation when there is a lack of input in the form of a poverty trap. In an ideal situation once the nutrients are fully released and made available to colonisers the seeds begin to germinate and new life establishes itself in the exploitation phase (r). In the learner this may be metaphorical for the construction of new ideas from older structures.

In the second part of the chapter I explained the three dimensions of the adaptive change cycle, connectedness (x-axis), potential (y-axis), and resilience (z-axis), as they related to ecosystem change and metaphorically to the learning process. The three dimensions are interrelated and overlapping, and they determine the behaviour of the cycle.

Connectedness in social and ecological systems is the degree of cohesion between elements. In terms of teaching and learning, connectedness overlaps the relevance of ideas in the completion of a student task. Connectedness also relates to the strength of feedback mechanisms. This strength of connections determines how quickly the system will return to a former state after a disturbance, and has direct association with the dimension of resilience.

Potential is the accumulation of capital in living and social systems. In a forest system potential is the build-up of combustible materials and thus the system's susceptibility to collapse through fire in the front loop of the ACC. Potential also builds up in the back loop with released nutrients from decomposition of organic matter. Nutrients are then taken up by colonising organisms leading to a shift from a burnt over wasteland to a grassy pre-forest scrub that can in turn be colonised by second growth forest species and so on towards full recovery of the forest system. In the learner, accumulation of capital could relate to the accumulation of integrated knowledge through experience. Such accumulation could occur through Piaget's (1950) model of equilibration through assimilation and accommodation. Assimilation can be thought of as quantitative changes to an idea such as a text with addition of examples and arguments that support the message but do not alter it. Accommodation, in contrast, are qualitative changes to the message. In the development of a student text that contains several ideas the individual may experience collapse, reorganisation and renewal events nested within the overall text development cycle. These smaller cycles I refer to as micro-events.

In both natural and social systems and within the learner resilience refers to the ability to bounce back after sudden or unpredictable perturbations, as well as the system's capacity to maintain constancy in its trajectory. Resilience is achieved by and large through goal directed feedback, but too much feedback can lead to rigidity and an inability to adapt to crisis. The adaptive change system predicts that collapse is inevitable. When the system is too rigid a collapse event can be severe and damaging rendering recovery difficult. Rigidity in the social systems and in the learner could be mitigated through an attitude of becoming. This can be

expressed through a language of modal verbs that render statements less certain and open to other possibilities and change.

CHAPTER 4

METHODS

As an agent of psychological, social, epistemological and cultural change, the teacher is always looking for an experience, a strategy, or an event that might tip the balance (Davis et al., 2000, p. 109)

The theoretical framework predicts that idea development will follow the four consequential phases of the adaptive change cycle (ACC). In this chapter I present a methodology to address the research questions:

1. To what extent can the learning experience be described using ACC and panarchy as a theoretical framework, and what insights can it offer in terms of research methodology and understanding about the learning process?
2. In terms of the ACC and panarchy metaphor, how did selected students respond to the integrated learning task in the consilience unit with a Year 13 French class in a New Zealand secondary school?
3. From the responses, what are the factors that enable the teaching and learning of consilience in a Year 13 French Class, and what factors act as barriers?

In the first section I detail the procedure followed to ensure that the research conformed to education research ethics standards. The methodology I chose to meet these research objectives was qualitative case study.

In the second section of this chapter I describe qualitative case studies and provide reasons for choosing this methodology. I identify the case using the Robson's (2011) definition and

flow diagram as well as the factors involved. Note that the theoretical framework of panarchy of teaching and learning, developed in Chapter 3 of this thesis, underpins my use of Gibbs's flow diagram. This means that each phase is composed of interconnected and overlapping ACCs of varying scales. I describe only those I consider most relevant to the research questions above.

In the third section, I outline the Unit of Work for School #1 which constitutes "input"; that is, the spoken, visual and written data with which the students worked (Nunan, 2004 Chapter 3, Input). By and large input serves as a means to create disturbance in students' worldviews. I discuss the nature of the controversy that was the subject of the Unit of Work. The section concludes with an outline of the stakes involved in students creating their podcasts.

The principal sources of primary data were audio recordings of classroom talk. In Section 4, I outline the methods employed to gather the audio data. Audio recordings were transcribed. Students' responses to the disturbance events were located. Instances of possible student transformation were located within the transcripts and the associated idea recorded. The evolutions of students' ideas were traced from beginning to end. Each utterance relating to the apparently transformative idea was re-transcribed using *Conversation Analysis* (CA) notation following Psathas (1995), Jefferson (2004) Cassel (2005), Ruusuvuori (2005), and Sidnell (2010) where each tenth of a second was accounted for.

The overall meaning of the utterance in context was guided principles of CA methodology. Emerging patterns from the transcripts were interpreted with their correspondence to documented phenomena in the literature. In this manner the interpretation of patterns of behaviour was by and large through inference where the most likely explanation was sought for the observation.

Of particular interest in the treatment of the data was to identify indicators of learner change (transformation) and map this change onto an ACC template; I detail the technique I developed and used to accomplish this. In order to verify initial interpretation and to ensure internal reliability of learner behaviour assertions as much as possible, the indicators of learner change were triangulated with supplementary data from pre-unit and post-unit of work questionnaires (Appendix 1), teacher-researcher debriefing sessions (Appendix 2),

classroom observational notes, and students' podcasts¹. Secondary sources of school magazines were also used to triangulate interpretations. I include in the discussion the reasons for the decision not to use participant interviews and to rely principally on classroom talk data.

Education Research Ethics

Educational Research Human Ethics Committee (ERHEC) (University of Canterbury) approval was received for the case study. Consent was required and received from the students, their parents/caregivers, the class teacher, the Principal and the school's Board of Governors. Copies of blank consent forms and ERHEC approval are included in Appendix 2.

Participation was completely voluntary. Students were free, for whatever reasons, to withdraw from the programme at any time. Every endeavour was undertaken to respect this freedom and no questions were asked so as not to impose any form of pressure that might compromise student willingness to participate and the collection of recorded data. In respect of this freedom, if students chose to work out of range of the digital recorders there was no attempt made to change the position of the recorders or to ask the students to take the recorders with them. Further, even though students were observed writing in their exercise books destined for their journals, no journals were submitted and no questions were asked of the students.

In lessons 7 and 8, the students L2 and L5 did not work within range of for clear audio recording. As a consequence, gathering data from their conversations was impaired and fragmentary during these lessons. This is a limitation of the data set.

Students were conscious of the digital recorders. There are instances where students reminded one another that they were being recorded, where students appear to perform for the devices and where students speak exceptionally fast and whisper in what may be attempts to avoid being recorded (see Lessons 1, 9, and 11).

Every effort has been made to ensure that neither individuals nor institutions suffered any form of harm during the investigation and will not suffer harm as a result of this research.

¹ Learning journals were issued to each student and detailed instructions were given as well as time in class to complete entries. However, students chose to withhold them. The reasons for this are discussed in this section.

The school is identified as a secondary school in New Zealand, and referred to as *School #1*. The teacher is referred to as *the teacher*, and each student is allocated a pseudonym of *L* for Learner and a number from *1 to 7*.

Profiling information about participants was gleaned from data sources already mentioned and also from the school periodical published quarterly and in the public domain. The name of the periodical is cited as *School News*.

Case Study Definition, Aims and Methodology

The focus of qualitative research is to document how participants make sense of specific experiences as they are lived (Sherman and Webb, 1988). It is useful to note that according to Merriam (1998) *qualitative research* is also known by seven other terms which are used interchangeably. They are: naturalistic enquiry, interpretive research, field study, participant observation, inductive research, case study, and ethnography. In this thesis I use the term case study.

A case study is “a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence” (Robson 1993, p. 52). The disciplinary orientation of this case study is ethnographic. Ethnography relates to the study of human behaviour *in situ*; that is, the investigation of what the participants do in a naturalist context (Merriam, 1998). This is both an interpretive and evaluative case study (Merriam, 1998). This entails developing a rich thick description that demonstrates the extent to which the panarchy model of teaching and learning is supported by observable learner behaviour. Following Merriam (1998) the central objectives of this case study are to discover, gain insight, and interpret learner responses to consilience themes in a small senior French class in New Zealand, using the theoretical framework of panarchy for teaching and learning developed in Chapter 3.

The learning process is modelled as a movement or flow between the four phases of the iterative ACC. This investigation seeks to know how students respond when confronted with the atypical situation of being taught consilience themes in a senior French language class, and seeks to find out why they responded in this way. Although, it is likely that idea development follows the four phases of the ACC, it is unlikely that the specific participant

responses could be predicted. For this reason, the case study was the best approach (see Yin, 1994; Merriam, 1998).

The case is the particular teaching and learning process experienced by the participant of the aforementioned class comprised of the participants nested in their socioecological context (see Stanger, 2011). Insights derived from a rich and holistic account of student responses to the real life phenomenon are a source of tentative hypotheses which may guide research in the future extending the knowledge of teaching and learning (Merriam, 1998) both of languages and of consilience in the New Zealand context.

In this way, I strived to deliver a complete, rich, holistic description and explanation of what unfolded over the course of the teaching intervention which I identify as the case or phenomenon (see Robson, 1993; Merriam, 1998). I endeavour to reveal the internal and external properties that may have generated the observed behaviour and artefacts that constitute responses to the teaching intervention. My aim was to create a heuristic account of the phenomena; that is, to illuminate the reader's understanding of the case (see Merriam, 1998). Further, in this investigation I wanted to determine the factors in the learning experience that may constitute enablers and barriers to using consilience in the French language classroom in the NCEA environment. In the pursuit of enablers and barriers an evaluation can be made of the suitability of the consilience Unit of Work for this particular French classroom in the NCEA environment in New Zealand.

Case Study Participant Relationships

The relationships between the key players in this case study are summarised diagrammatically in Figure 4.1. The schema is based on Robson's (1993) case study conceptual framework. The diagram should be read from the top left beginning with the gatekeepers who grant the researcher access.

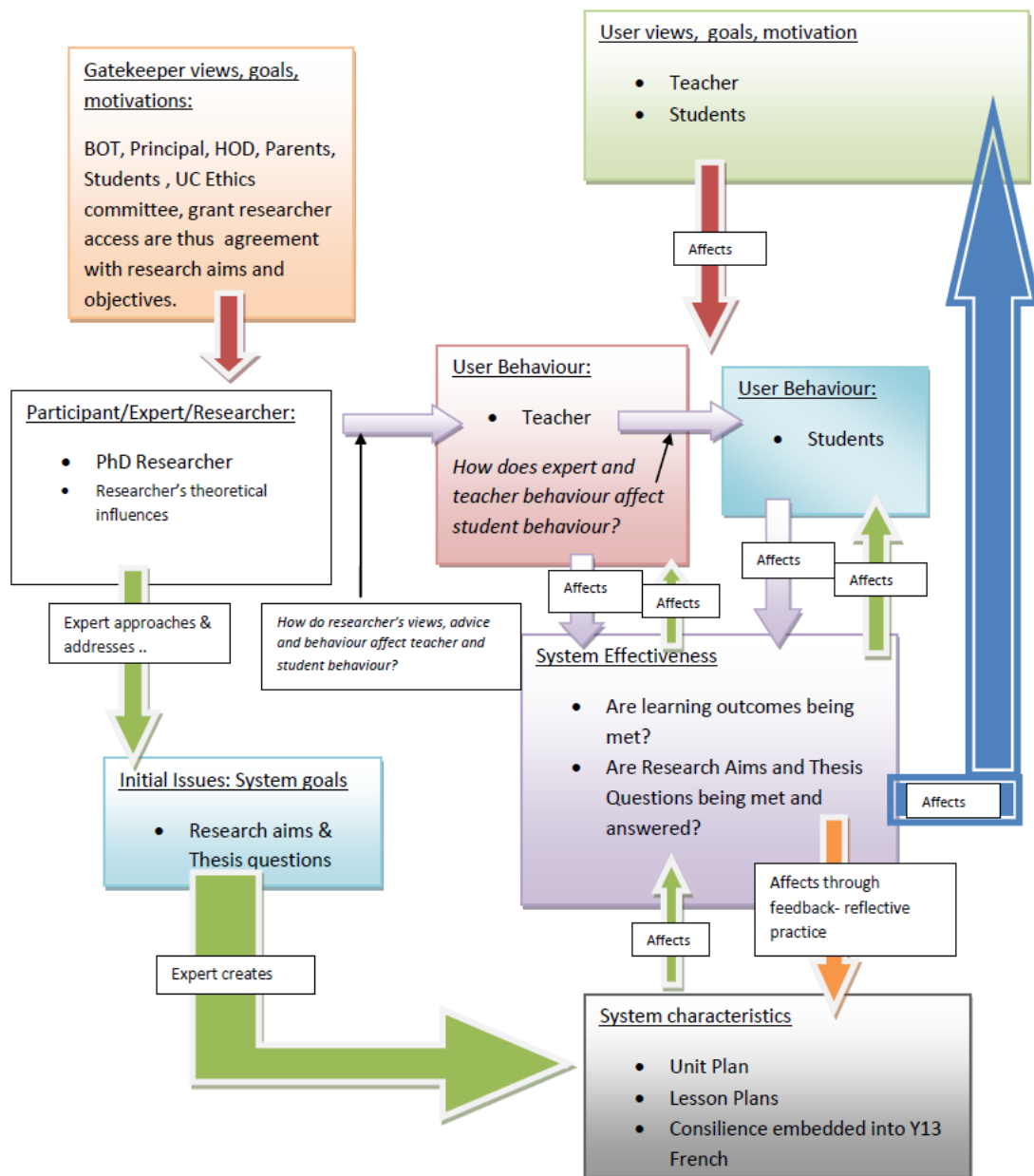


Figure 4.1 Case study conceptual framework revealing the relationships between gatekeepers, the participant/expert/researcher, participants and the Unit of Work (adapted from Robson, 1993).

All gatekeepers gave their approval and were thus in agreement with the aims and objectives of the investigation. The gatekeepers are identified as: the school Board of Trustees, the school Principal, the subject Head of Department, the Parents and caregivers of the students, the students themselves, the University of Canterbury Ethics Committee (see discussion on the research ethics issues for this case study in this chapter). I identify myself as the researcher/expert. I am providing for the participants an innovative Unit of Work that is designed to address the *NZC* Principle of Coherence through the Learning Languages Learning Area; this constitutes the system goals Panarchy and E.O. Wilson's interpretation of consilience influence the theoretical approach, both in terms of the Unit of Work and the interpretation of participant responses to it. The system characteristics are contained in the Unit of Work, described in this chapter and documented in further detail in Appendix 1.

My adaptation of Robson's flow diagram highlights the influence of the researcher/expert on both the teacher and the participants. During this investigation I am sensitive to how my world view, values, advice and behaviour affect teacher and student behaviour. The central focus of the diagram is the role played by system effectiveness of the Unit of Work and its interdependence on my behaviour and that of the participants. The diagram illustrates that system effectiveness affects participant behaviour, and vice-versa. Teacher and students' responses may result in revision of the Unit of Work to ensure objectives are being met and as expert as well as researcher and participant.

The large vertical arrow on the right hand side of Figure 4.1 designates the assumption that if the system is effective then it is expected that student values will be affected, and that this will reverberate through the behaviour of participants and may be reflected in student work in terms of user views, goals, and motivation. I acknowledge that response to participant behaviour and change to the Unit of work constitutes feedback.

In response to student and teacher reactions to each lesson, modifications to content and language were made for the coming lesson. The teacher asked me to help explain or elaborate on connections on three occasions: in Lesson 4, Lesson 5, and Lesson 6 and to be present as a possible aid to students.

Single Case Analysis

The aim of CA is to construct a convincing and comprehensive analysis of a single case. Once this is done other similar cases are sought in order to assemble a collection that represents an “interactional phenomenon” (Lazaraton, 2003, p. 3). In this manner one student was chosen as the single case. The choice was based on the comprehensiveness of the data and whether a full picture of her learning could be accounted for from the audio recordings and supplementary data. Once the analysis was complete another student from the same context was chosen, using a similar process. In this instance both students were very vocal and actively engaged in the tasks. The two students were L4 and L5. L4 had not taken French in Year 9, the first year of secondary school and had received approximately 656 contact teaching hours. The teacher said of L4 that, “her French is not very good but she is as sharp as a tack” (Appendix 5: Student Profiles). In contrast, L5 had received approximately 719 hours of contact teaching time. In addition to this, in the Christmas holidays of December 2010-2011 L5 participated in a six week exchange trip to France along with her classmate L1 (School News, 2010). In general, study abroad on trips such as this has a positive impact on the fluency rates of learners (Freed, 1995). In addition, L5 had taken French lessons privately. L5 appeared to exhibit greater confidence and fluency than L4. The teacher considered L5 to be her top student (Appendix 5: Student Profiles).

The Unit of Work for School #1

In this section I describe the rationale and structure of the Unit of Work to makes steps toward the *NZC* Principle of Coherence and curriculum grace through consilience. The *NZC* for Learning Languages takes a communicative approach and there is an emphasis on Task Based Language Teaching (TBLT) (Ellis, 2005; MoE, 2007). The Unit of Work was built with reference to these ways of teaching languages but leans towards the allied Content Based Instruction (CBI) and its offshoot Content and Language Integrated Learning (CLIL).

In the first part of this section I elaborate on the nature of these approaches. Next, I give an account of the *NZC* Learning Objectives and Learning Outcomes that underpin the unit. In the third part of I explain how the Unit of Work was integrated in two ways. First, the topics within each lesson and between each lesson were underpinned or integrated by the common theme of authenticity. Authenticity was connected to biological evolution through E.O.

Wilson's (1998) model to explain the existence of the arts. In brief, authenticity was assumed to be a cultural artefact that had come about as a response to an estrangement from Nature and God through the advent of modernist thinking. Authenticity may exist to assuage the biological need for a sense of belonging to the world. Belonging is assumed to be a predisposition and remnant of instinct.

Communicative Language Teaching.

I designed the Unit of Work to be in accord with the principles Communicative Language Teaching (CLT) which is in alignment with the *NZC* for languages (see Ellis, 2005; East, 2014). CLT comprises a constellation of associated language teaching approaches that are learner centred and largely experiential (Nunan, 2004). These include bilingual education, Sustained-Content Language Teaching (SCLT), Task Based Language Teaching (TBLT), Content Based Instruction (CBI) and finally Content and Language Integrated Learning CLIL. The Unit of Work comprises elements of TBLT and gravitates mostly in the direction of CBI. In the following passages I outline the nature of CLT, TBLT, and CBI.

The emphasis of CLT is for the language user to focus on the collaborative negotiation and the communication of meaning over language form (that is, the morphosyntactic features of grammar and vocabulary), (Savignon, 1991; Nunan, 2004). In other words in CLT language is a tool for the making of meaning (Nunan, 2004; Ellis, 2005). CLT is also an experiential (see East, 2014) learner-centred teaching style (Savignon, 1991). Research into second language acquisition suggests that CLT is more effective than the traditional grammar-translation approach that involves the memorisation of vocabulary and grammar with an emphasis on accuracy over the negotiation of meaning (Larsen-Freeman, 1991; Savignon, 1991; Ellis, 2005; Nunan, 2004). Nevertheless it is necessary to give students the morphosyntactic features or language tools to construct meaningful utterances (Nunan, 2004). Evidence strongly suggests that students will learn these structures when they are associated with learner needs and experiences (Larsen-Freeman, 1991). In accord with this, formulaic expressions and vocabulary were included in the Unit of Work. Student texts included structures and vocabulary of importance to the high stakes assessment needs of the students (Appendix 1).

Task Based Language Teaching

Task Based Language Teaching (TBLT) emerged out of CLT (Nunan, 2004). In terms of methodology TBLT has overlap with CLIL. Of importance to both TBLT and CLIL is that they are task centred. Nunan (2004) notes that a language task used in the classroom, or a pedagogical task, has the following characteristics. It is a piece of classroom work where the student is engaged in, “comprehending, manipulating, producing or interacting in the target language while their attention *is focused on mobilizing their grammatical knowledge in order to express meaning*, [emphasis added]”. As with CLIL, it is not essential for in the target language so long as the outcome is in the target language (refs). “The task should also have *a sense of completeness*, being able to stand *alone as a communicative act* in its own right *with a beginning, a middle and an end* [emphasis added]” (Nunan, 2004).

Content Based Instruction

Content Based Instruction (CBI) is predicated on the assumption that language and the subject matter are intertwined (Mohan, 1986); that is, that form is inseparable from content (Savignon, 1991). Nunan (2004) categorises CBI as part of experiential language instruction that exposes learners to authentic parcels of language that have not been simplified for the learner, and require the student to take it apart to gain comprehension (Nunan, 2004). For Nunan (2004), CBI is an example of Wilkin’s (1976) analytic approach to syllabus design. The analytic approach is one of two frameworks for syllabus design. The more traditional approach involves a process of the simplification of a body of information and the teaching of it in a step wise manner from easy to difficult (Nunan, 2004). The learner gradually puts the body of information back together again; Wilkins (1976) referred to this as the synthetic approach. The two principal advantages of CBI are that the teaching of content makes connections with other Learning Areas in the school context. Second, the fact that the content or topic is explored in depth means that language learners are exposed to the target language for longer periods than if they were studying content uniquely for the extraction of specific linguistic forms (Murphy & Stoller, 2001).

The NZC designed to be flexible so that each teaching and learning stakeholder can use it to meet their specific needs (MoE, 2007). The Unit of Work for this project was designed to conform to the three design stages of the NZC at a national, school, and classroom level. A Unit Plan was submitted as a brief to the teacher, School Principal, and the Board of

Governors for their approval. The Lessons in the Unit of Work were written in consultation with the teacher and revised in response to ongoing classroom observations and discussions with the teacher during informal debrief moments after class (Appendix 2).

In designing the Unit of Work it was necessary to include and take heed of key elements of The NZC requirements for Learning Languages. These were, Proficiency Descriptor, Overarching theme/s, Achievement Objectives (AOs) and Learning Outcomes (LOs). The Proficiency Descriptor was that students should be able to “express and justify their own ideas and opinions, and support and challenge those of others” (MoE, 2007, *Languages Wall Chart*). The overarching theme is the connections between the sciences and the arts (Consilience), which in this project is the cross over between the topics of Environmental Issues and Creative Arts for Level 8 French.

The AOs provide the basis for assessment (MoE, 2007). The AOs for French are comprised of “the knowledge, understanding and skills” that relate to the Learning Area of Learning Languages (MoE, 2007, p. 39). The AOs for Level 8 French are three fold. First, the emphasis is on the communication of “information, ideas and opinions”, using complex and diverse texts “effectively for a range of purposes” (p. 39). Second, students are encouraged to “explore the views of others”, share their own views, support, and question these views and the views of others (p. 39). Third, students are to “engage in sustained interaction” and create “an extended text”, which includes developing an understanding of language and cultural elements that facilitate the critical responses to texts (p. 39).

The Learning Outcomes were as follows. At the end of the unit, the students will be able to use the structures and vocabulary to which they have been introduced and their knowledge of related sociocultural aspects to communicate about:

- the environment
- creative arts
- the connections between the natural science and the humanities

with confidence, accuracy, fluency, and increasing flexibility in the specified contexts.

Included in the unit was the opportunity for community involvement. Students will be given the task of critically interpreting the Quail Island Ecological Restoration project for the French audience in New Zealand. Students will meet Trust members and experts and will

create a podcast for the Christchurch *Alliance Française* and the website Frogs in NZ. The podcast would also form the summative assessment for NCEA.

Overall the tasks in the Unit of Work involved the sharing of opinions. This conformed to “opinion-gap activity” in which students draw on information from French texts and their own knowledge to express an opinion (Prahbu 1987 p. 47). Opinions were to be shared in the target language within their small groups and is shared across groups. The rationale underpinning the group sharing of information is in part that learning is socially mediated (Nunan, 2004).

The unit plan was delivered as a brief to the school principal and Board of Trustees for approval. The unit plan along and student support material are included in Appendix 1.

The teacher intimated that she had not taught in this manner previously. The teacher also said she that regarded the CLT approach with scepticism considering that it represented a bias toward language function to the neglect of form. On the continuum of teacher-centred to student centred teaching the teacher was more traditional and leaned toward the teacher-centred grammar translation approach (see Ellis, 2005; Cross & Gearon, 2012; East, 2014)

In the Unit of Work each lesson was underpinned with Freire’s (1970) problem posing education as interpreted by Jansen (2011) for New Zealand secondary education. The purpose is empowerment, transformation and praxis. Student experience of disturbance material involved four phases: own story, expert story, critique, and evaluation. In this way, students were allowed the freedom to interpret phenomena in their own way. This was followed by an examination of an expert view which they would then critique. Finally, students evaluate the information and evaluate the phenomena in the light of their analysis. The evaluation phase took the form of student production and represented an argument in the form of the oral presentation in French.

In each lesson I included in the expert texts what I considered to be an as yet unresolved inference or hypothesis that I opened up to the participants for critique. I did this to show belief in the students that they possessed the thinking skills to critique the proposed notions. This is in accordance with Freire’s principal of empowerment and Giroux’s elaboration of Freire’s principles in the form of critical pedagogy (see Freire, 1970). I also had an emotional

investment to certain ideas which I considered to be the germs of future research that I wished the participants to consider.

In the case of Lesson 1 where I wrote a text on the historic and Darwinian origins of French courtly love, I considered that I possessed minimal understanding of the subject but even so sufficient to create a text that would generate controversy, discussion, a pretext for critical thought, and contributions from the students. I discuss the issue of coming to terms with foreign academic domains in the teaching of consilience in the section entitled *Limitations of bridging the two cultures* later in this chapter.

Thematic Integrated Learning

A common theme was used in as a means to connect cultural and biological topics laterally within and across the lessons in a manner reminiscent of congruence after Wilson, D.S. (2012), the second wave of consilience after Slingerland and Collard (2012), and the seeking underlying patterns after Bateson (1972, 1979). The theme was selected for its presence in each of the topics and because the theme could be considered an expression of biological human nature.

The use of this facet of human nature could potentially open up a door to a class discussion on human nature and its evolutionary origins. I refer to this process of seeking an evolutionary explanation for a cultural artefact in the context of this case study as making a vertical connection (cf Tooby, Cosmides & Barkow, 1992). The possible advantage of creating vertical connections to the topics in a senior language class could be to shift discussion topics away from the superficial and familiar², and provide opportunities for critical thought, greater student engagement, and hence the possibility for the target language acquisition (see Krashen, 2011; Siegel, 2014; Fraser, 2014).

I chose the theme of authenticity to make lateral and vertical connections. This was because the pursuit of the authentic is a motive for travel (Cohen, 1988) and therefore has relevance to

² Note that in their external assessments students at NCEA Level 3/NZC Levels 7 and 8 are expected to be able to deal with adapted texts that are ‘about reasonably familiar contexts ... [and which]... reflect the relationship between language and culture’ (NZQA, n.d., p. 1).

students studying French for travel purposes (Yogeeswaran & Leschi, 2015). The notion of the authentic is prevalent in the field of environment issues in relation to the ecological restoration of authentic Nature. Further, the theme of the environment was prevalent in the teaching of senior French in the teacher's experience. She intimated that creating a task based Unit of Work centred on an environmental theme with links to cultural topics would be appropriate for her students.

The topics were chosen in consultation with the teacher. The topics were modified progressively in response to student reactions to lessons. The topics were: an evolutionary interpretation of medieval Provençal courtly love and the premodern world view of Nature and God, French food and Genetically Modified Organisms (GMO), the New Zealand environment and French tourism to New Zealand, the ecological restoration of a local island, and giving a talk in French about the island, Māori spiritual values of that island as compared to sustainable development, French environmental values, and finally an overview of world views along with their relationship to how the individual sees themselves in relation to nature, both horizontally and vertically.

In the next section I explain how authenticity was used as the connecting thread between the topics and between the lessons both horizontally and vertically. I begin with an overview of the nature of the authentic, and its relationship to the teaching and learning of languages.

Authenticity

In this section I give a brief overview of the notion of authenticity in a span of disciplines with a focus on education. I begin the overview begin with the sciences including evolutionary psychology. After this I discuss how authenticity is conceived in the social sciences of anthropology and the geography of tourism. Following on from this I look at how authenticity is regarded in philosophy with attention paid to Martin Heidegger, Jean-Paul Sartre, and Paulo Freire. I include here also the work of ethicist Margaret Somerville and her notion of the authentic in relation to human spirit and the secular sacred. I conclude this discussion with how the authentic is regarded in education. The outcome of this discussion is that authenticity can be viewed as a quality that facilitates a connection between the individual and the other (after Dutton, 2010). I propose that a convenient metaphorical pattern to encapsulate this concept is that of a conduit or tube.

Authenticity is connected to feelings of belonging to a group and its opposite alienation (Cohen, 1988; Menzies & Davidson, 2002). The pursuit of authenticity is an expression a search for belonging (Cohen, 1988; Bessant, 2010; Wilson, 2012). Group formation and bias towards group members are human universals (Pinker, 2002; Wilson, 1998, 2012; Fiske & Fiske, 2007; Baumeister & Leary, 1995) and a sense of community is vital for social cohesion and has an inherited basis as Dunbar (1999) says, “The lack of a sense of social unity may be the most pressing social problem of the new millennium” (p. 33).

For some writers in the humanities authenticity has been conceived as a cultural artefact of a sentiment of this alienation or not belonging to the world. Authenticity is seen an expression of a desire to return to a holistic premodern, that is, pre-Enlightenment world view (see; Trilling cited in Cohen, 1988; Davis et al., 2000; Sumara et al., 2001; Bessant, 2010; Balaev, 2014). In the field of anthropology, Handler (1986) and Cohen (1988) view authenticity as a social construct of the modern western world. Authenticity in the field of tourism involves the search for authentic experiences, seeking pristine, primitive, and natural places (MacCannell cited in Cohen, 1988). In the realm of consumerism authenticity is of central importance in product promotion (Goldman & Papson, 1996). It is argued that the authenticity sold in advertising is by and large fake (Millard, 2009; O’Neill, Houtman & Aupers, 2014). O’Neill et al., (2014) hypothesise that consumers are not duped by false claims of authenticity but exhibit instead a need to indulge in such a myth.

In the arts Dutton (2010) argues that authenticity facilitates a connection with another human being:

Authenticity, which in the arts means at the most profound level communion with another human soul, is something we are destined by evolution to want from literature, music, painting, and the other arts. This sense of communion exhilarates and elevates the spirit (p. 195).

Authentic storytelling is a kind of experiential learning. It imparts knowledge and pleasure by disengaging the listener from reality. This is Kantian “disinterestedness” or “decoupling” (Tooby & Cosmides cited in Dutton, 2010, p. 173-174) and arguably enabling them to enter another yet imagined reality.

The authentic is defined by Somerville (2008) as “the secular sacred” (p. 54), which elicits awe and wonder, and for her it is reminiscent of Kant’s notion of “spirit” (Kant & Pluhar,

1987 pp. 181-182). For Kant spirit generates thought and wonderment and comports as if it has a life of its own. Kant's notion of spirit may have overlap with sudden insight, the a-ha or eureka moment where new information combines with multiple sources of memory to create thought (Milner et al., 1998) where one idea reverberates and revises all others (Ehrenberg, 2010). Somerville (2008) argues that authenticity/secular sacred revitalises a transcendent sense of relatedness or connectedness to others and the universe which she refers to as "human spirit" (pp. 56-57).

For Freire (1970) transcendence of one's present conditions is an expression of one's human nature to grow and develop; in this sense, humankind is a 'project'" (p. 53). This process of change can occur through critical thought such as in "problem-posing education" (p. 84). In this manner the student is able to dialogue with their teacher. For Freire's approach, dialogue entails a process of mutual feedback that leads to the transformation of both student and teacher (p. 80):

The teacher is no longer merely the-one-who-teaches, but one who is himself taught in dialogue with the students, who in turn while being taught also teach. They become jointly responsible for a process in which all grow (Freire, 1970, p. 80).

Dialogue will only be effective; that is, able to transform the world and the participants in the dialogue if it involves "the authentic word". Failure to achieve this authenticity will lead to alienation:

When a word is deprived of its dimension of action, reflection automatically suffers as well; and the word is changed into idle chatter, into verbalism, into an alienated and alienating "blah". It becomes an empty word, one which cannot denounce the world, for denunciation is impossible without a commitment to transform, and there is no transformation without action (Freire, 1970, p 87).

Given its nuanced and diverse meaning finding a definition of authenticity is not easy (Bencze & Hodson, 1999). In the field of science education authenticity relates to student centred and open ended tasks that are undertaken by learners and which have direct relation to the work of scientists in the real world. This definition has overlap with experiential learning. In the field of education experiential learning and authentic learning are aligned (Knobloch, 2003), if not synonymous. Chapman et al. (1992), Proudman (1992), and Forgarty (1998) each define experiential learning as being emotionally and intellectually

involved and hence connected to subject matter/content. Furthermore the authentic experience connects students with the professional world through relevancy and potential for success (for science teaching and authenticity, see Braunda & Reiss, 2006). For Dewey (1938), each authentic experience leaves the student changed. There is a sensation of continuity where the authentic experience leads to the student reviewing and interacting and making connections with their past and present as they try to make sense of what they have experienced. This in turn alters their future choices (Dewey, 1938). Authentic teaching is possibly the ability of the teacher to create a unity in the classroom through expert and referent power whereby the teacher connects meaningfully with her students (see French & Raven, 1959; Martin, 1978; Tauber 1993; Finn, 2012).

In summary, it appears that authenticity facilitates the individual to form a connection and/or unity with the other. A convenient and extant metaphor to embody authenticity could be the tube metapattern after Volk (1995, pp. 33-39). This appears to have overlap with Reddy's conduit metaphor of communication as a transport system that carries us through to unrelated conceptual domain (Reddy, 1978). Sfard (1998) argues that this is the role of metaphor. The term metapattern comes from Bateson's (1978) introduction to *Mind and Nature* where he uses it as equivalent to patterns that connect. Volk was a student of Bateson's and describes his way of teaching a metapattern through comparative anatomy. A metapattern is a common pattern found across animal classes. Bateson did not confine his thoughts of metapatterns to biology but as Volk explains pursues them across the discipline. Volk cites the example of Bateson considering human learning and evolution by natural selection as sharing the same metapattern of variation and selection (Volk, 1995, p. vii). Volk (1995) offers his own definition of metapatterns as patterns that are found throughout all phenomena. He writes,

To me, a metapattern is a pattern so wide flung that it appears throughout the spectrum of reality: in clouds, rivers, and planets; in cells, organisms, and ecosystems; in art, architecture, and politics (p. viii).

Volk identifies ten such patterns. Of interest to this discussion on authenticity is Volk's metapattern of the tube. The most important property of the tube is that it is a conduit for flows of mass, energy, and information from point A to point B (p. 38). Such points can be "spheres" which Volk includes in his list of metapatterns (pp. 3-28). Together the tube and the sphere make up relations between things, places, and ideas. Volk (1995, p. 39-40) and Volk & Bloom (2007) note that such relations are characteristic of graphic representations of

idea linking through mind mapping and so on. In addition, the tube and sphere could represent spiritual zones and the connection between them (Volk, 1995).

Authenticity and belonging and human nature

It is arguable that authenticity is a social construct and a cultural artefact (Cohen, 1988). The apparent function of authenticity as artefact is to facilitate connections between the individual and the other (Dutton, 2010). In this way authenticity may be linked to the desire for belonging (Cohen, 1988; Menzies & Davidson, 2002). This desire for belonging is arguably associated with the social nature of humanity and it is likely to have a biological foundation (Dunbar, 1999; Pinker, 2002; Wilson, 1998, 2012; Fiske & Fiske, 2007; Dawkins, 2006; Baumeister & Leary, 1995).

The notion of belonging can be readily linked to altruism humans and its evolutionary origins and purpose (Wilson, 1998, 2012). The desire for belonging is arguably biologically determined and the product of genetic evolution and an expression of a universal human nature.

The above explanation of authentic as a cultural artefact may be consistent with Wilson's (1998) view of the duality of human concerns. For Wilson human beings are both intellectual and emotional. The emotional part is composed of hardwired, but culturally malleable, predispositions that are the remnants of instincts which he refers to as "epigenetic rules" (p. 139). The intellectual part of humanity has led to an awareness of death, the self, and the apparent chaos and unpredictability of the world and universe that surrounds us. The purpose of the arts argues Wilson (1998) is to assuage the malaise that comes from these three human preoccupations.

In alignment with E.O.Wilson's model, authenticity as a cultural artefact can be thought of as means to address the uncomfortable feeling of alienation, or lack of belonging, that has come about through the intellectual tradition of modernism that has enabled separated humanity to see themselves as separate from the world (Prigogine, 1987; E.O.Wilson, 1998; Davis et al., 2000; Sumara et al., 2001). That is, authenticity may be considered of as symptomatic of the malaise that has come about through the transitioning from the premodern to the modern world view (Figure 4.3).

For E.O. Wilson (1998) the human condition is characterised by a dichotomy between intellectual realisations and the remnants of instincts in the form of predispositions which, as noted, he refers to as epigenetic rules. Both intelligence/language and culture and instincts are the result of evolution and are genetically determined. The predispositions are also hardwired but culturally malleable. Wilson summarises the intellectual realisations as three components: a high human intelligence, culture and language. These facets of the mind have led to an awareness of death, the self, and chaos. I refer to these three realisations with the shorthand term of Wilson's triad. The Enlightenment revolution contributed to the modern view of separation from nature and God. This was a shock to the genetic predisposition for order and belonging. The arts exist, argues Wilson, to assuage that shocking realisation of detachment and alienation from the universe. It is arguable that the pursuit of authenticity is a cultural artefact that seeks to relieve the need for belonging; that is, to cater to sentiment of detachment and alienation (Figure 4.2).

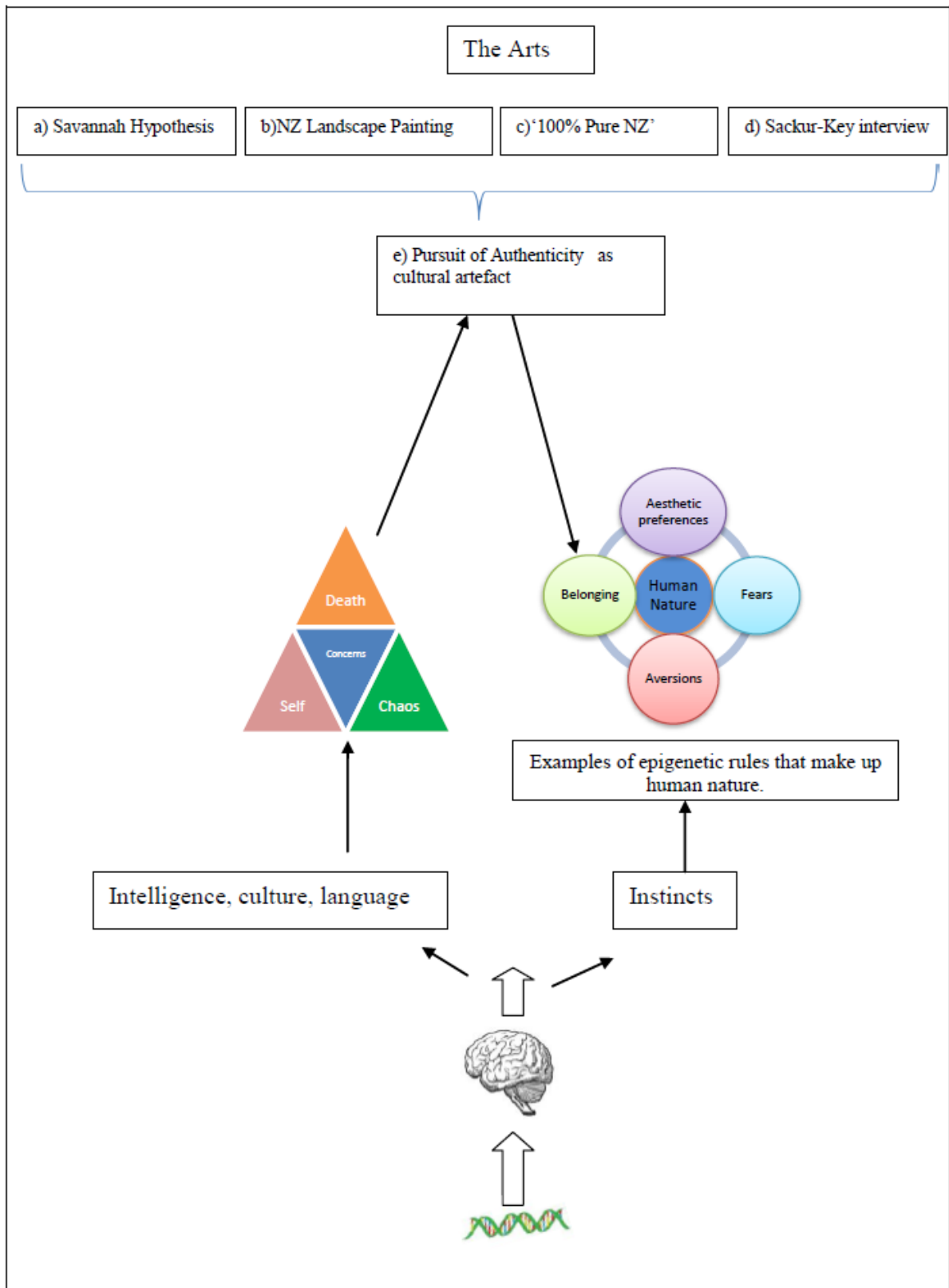


Figure 4.2 Rationale for Curriculum Coherence through E.O. Wilson's (1998) consilience and D.SWilson's (2012) congruence

At the top of the Figure 4.2 running left to right, the teacher presented these ideas to the class in chronological order in French. They were underpinned by the theme of the authentic. The pursuit of the authentic is proffered in the Unit of Work for consideration as a possible epigenetic rule. a) Do students' drawings of their ideal landscape correspond to the savannah? b) Colin McCahon believed he could communicate the real New Zealand landscape that was beyond the tourist sites and tourist gaze. c) and d) Students critiqued the branding of New Zealand as a tourist destination as 100% Pure New Zealand in relation to the BBC *Hardtalk* interview in 2011 in which journalist Stephen Sackur challenged Prime Minister John Key on the authenticity of this marketing claim in the face of serious environmental pollution and biodiversity decline (Key, 2011). e) The triad of human concerns (see E.O. Wilson, 1998), is made up of the awareness death, self, and chaos or the unpredictability in the environment. Thus the interest in the authentic may relate to the human awareness of the complexity and apparent chaos in the social environment. Such awareness is the product of human intelligence and the predisposition towards acculturation as represented by the brain, which are the products of evolution as symbolised by the DNA strand.

The Lessons

Lesson 1

For Lesson 1 I selected as the first topic of consideration the nature and origins of Provençal courtly love. Students considered the authenticity of this mode of courtship in relation to animal courtship and Darwinian notions of sexual selection in comparison to contemporary practice. Students also considered courtly love as an expression of the premodern world view that saw humanity, Nature, and God as a unity (see Davis et al., 2000).

To fully appreciate participant responses to the lesson, as detailed in Chapter 5, it is necessary to understand the concepts and the controversy that surrounds them. In the following passages I outline the salient points of French Medieval courtly love. Note that the student homework and class readings with an English translation are provided in Appendix 1 (Unit of Work).

Fin'amors (fine love), now known as by its nineteenth century term *l'amour courtois* (courtly love), was both an elite literary genre and a possible cultural phenomenon that first appeared in Provence, France, without any indications of its origins (Kay, 2001). Supported by Eleanor

of Aquitaine as patron, it spread to Languedoc/Occitania, Champagne, and later to England, Germany, and Spain. It was popular during the twelfth and thirteenth centuries (Dronke, 1996; Boase, 1977; Nye, 1992; Kay, 2001).

Courtly love designates a stylised and prolonged platonic love between nobility involving a married lady and a knight (Dronke, 1965, 1996; Boase, 1977; Nye, 1992; Kay, 2001). Courtly love was considered to have ennobling benefits. In this manner it has overlap with the eleventh century Persian writings of scholar Ibn Sina (Avicenna), notably his *A Treatise on Love* (Denomy cited in Bell, 1986). Scholars consider that aspects of *fin'amors* may have been derived from contact with the Arab and Persian writings during the first crusades and imported to Europe (Boase, 1977; Dronke, 1996)

It may have been conceived to evoke a profane love that would parallel the divine love of Virgin Mary for God, the Father (Dronke, 1996). Alternatively the love was between Sophia or Spientia also known as the divine feminine for “the sons of man” as described in Proverbs 8, The Song of Songs and Book of Wisdom, as first proposed by Bernard of Clairvaux (Dronke, 1996). It has also been proposed that *fin'amors* parallels the love between Jesus Christ and Mary Magdalene as recorded in the Gnostic gospels of Phillip and Mary (de Rougemont & Beligion, 1956). These beliefs may have played a role in the heretical practice of Catharism practised in Languedoc and suppressed by the Roman Catholic Church, commencing with the Albigensian Crusade (1209-1229) and concluding with the Inquisition (see de Rougemont & Beligion, 1956; Dronke, 1996; Boase, 1977; Baigent, Leigh & Lincoln, 2004)³.

I was not aware of the Gnostic aspects at the time of constructing the lesson. The teacher did not disclose this information to participants during Lesson 1.

In this lesson I focused on the medieval world view as premodern. This is it was characterised by a belief that nature is an expression of the mind of God (see Davis et al.

³ Gnostic refers to divine knowledge. Gnosticism is a form of early Christianity based on apocryphal writings that sought to reveal through certain knowledge, a divine spark in all humans. This knowledge would elevate the individual to anthropos or to a state where one is fully human and in a state of oneness with the divine. The Gnostic gospels refer to sets of authentic ancient texts discovered in Egypt in the late nineteenth century, and in the mid-twentieth century (Leloup, 2002).

2000). On the basis that nature exists to serve mankind, and animals serve as conveyances of moral lessons to humanity, including those regarding courtship (see Yamamoto, 2000), I hypothesised that aspects of courtly love may be derived from observations of the courtship of animals and in particular birds, though there is not direct support for this in literature. The emphasis on birds was deliberate given the overwhelming presence of birds in medieval literature and art (Clark, 1969). The thirteenth century poetic account of a courtly love affair by Guillaume de Lorris and Jean de Meun, *The Romance of the Rose*, was the most popular book of the time. In this work De Lorris depicts the God of Love as “entirely covered with birds...[and was one who]...seemed to be an angel come straight from heaven” (p. 15) (de Lorris. & de Meun, 1225-1278/2008).

Darwin (1871) remarked that birds and humans “... have nearly the same taste for the beautiful ...” (p. 307). He notes that the flamboyant plumage of the male Argus pheasant species was acquired through “...the preference of females over many generations...” (p. 412). In this way the male Argus pheasant is in part the creation of female preference (sexual selection directed by the female of the species). Darwin proposed that human sexual dimorphism was due to competition between males for females, and to an acute aesthetic and discerning sense of women for certain male characteristics. In so saying Darwin makes the claim that women play a central role in directing the course of human evolution (Zimmerman, 2007). As a means to incite group discussion amongst the students, in the student handout I paraphrased Darwin’s view of the role of women on sexual selection in French claiming that whatever a man is physically and/or mentally may be due at least in part to sexual selection governed by women. I proposed that the excessive and hyperbolic adoration for women that characterized courtly literature (Clark, 1969) is thus understandable given their role in human evolution. In fact, the observation that female coyness is reflected in the troubadour poetry is supported in the literature. For example, Monson (2011) applied evolutionary thinking to courtly love to explain why the lady in courtly literature is often distant and cruel to her suitor (see also de Rougemont & Belgion, 1956). Students were asked to give and justify their opinions of the ideas in the text and to seek the opinions of others in their group, and share their answers with the class. Students were expected to interact in French.

Lesson 2

Lesson 2 dealt with the modern world view in which humanity positions itself outside Nature and society. A corollary to this is the sentiment of estrangement and inauthenticity (see Davis et al., 2000). The theme of the authentic underpinned this lesson and determined the choice of topics that the students would consider. The lesson was predicated on the relationship between a sense of belonging to a place and the perceived authenticity of that place, whereby a sentiment of inauthenticity lead to a sense of alienation (see Cohen, 1988; Davis et al., 2000; Bessant, 2010).

Students considered the anti-GMO movement in France as led by environmental activist José Bové. The lesson focuses on the attempts to restore authentic means of agricultural production and authentic French cuisine in reaction to American style fast food (Bové & Dufour, 2002; Freeze, 2002).

Lesson 3

In Lesson 3 the theme of the authentic is introduced in terms of the pursuit of pristine and original Nature in the New Zealand conservation movement. Authenticity is first dealt with in relation to students' ideal landscapes in contrast to representations by notable New Zealand landscape artists such as Brent Wong and Colin McCahon. McCahon believed he was painting the authentic New Zealand beyond the tourist gaze (Alderton, 2015). McCahon invited New Zealanders to love their country for what it really was (Pound, 2009; Alderton, 2015). These two perceptions are viewed in relation to the controversial international advertising campaign 100% Pure New Zealand that reportedly misrepresents the quality of the New Zealand environment (Key, 2011; Galtry, 2013; Foote, Joy & Death, 2015; Desmarais, 2015). Of note is that in the campaign New Zealand is promoted as an authentic experience (Bell, 2008). This allowed students the space to discuss the apparent discrepancy between the projected image and the reality, including the possible willingness of consumers who are aware of the misleading claims of authenticity in advertising but who still believe the myth (O'Neill et al., 2014).

Students were introduced to this theme through a contemplation of their ideal landscapes vis-à-vis the controversial savannah hypothesis (Orians & Heerwagen, 1992) in relation to artistic representations of New Zealand. In the following passages I give a précis of the

hypothesis followed by opposing views to it. Orians & Heerwagen (1992) claim that humans have an innate mental imprint of high-quality tropical African savannah. This image represents the place where the human species evolved and our ideal habitat preference. This mental image includes grassland, with copses of trees with spreading branches, a body of water, all of which is observed from a hillside the site of an equally ideal habitation. Humans find this landscape beautiful (Dutton, 2010) and seek to recreate it as parkland (E.O. Wilson, 1998). This is an expression of habitat selection which entails a species preferring the habitat in which their genes were assembled. Therein “lies survival...[and]...mental peace as prescribed by our genes” (E.O. Wilson, 1998 p. 310). However, the discovery of the fossil human ancestor *Ardipithecus* suggested forest origins and undermined the savannah hypothesis (White, Suwa, Asfaw, Yohannes, Lovejoy, Suwa, & WoldeGabriel, 2009; White, 2010). Also standing in opposition to the savannah hypothesis are Bender, Tobias & Bender (2012), who argue that the savannah hypothesis ignores features of human evolution that suggests that human ancestors may have passed through an aquatic phase.

The theme of the authentic underpinned this lesson and determined the choice of topics that the students would consider. The lesson was predicated on the relationship between a sense of belonging to a place and the perceived authenticity of that place, whereby a sentiment of inauthenticity could lead to a sense of alienation (see Cohen, 1988; Davis et al., 2000; Bessant, 2010). Students were informed that at the end of this module that they would have to compose a podcast that presented a New Zealand conservation project in the light the reality of the state of the environment.

Lesson 4

In Lesson 4 students were exposed to an active conservation project in the region. The project entails the ecological restoration of Quail Island, a small 80 hectare inshore island (see Genet & Burrows, 1999). Students learnt of the extent of devastation of forest through the advent of humanity and notably during the colonial period as well as the goal of the Department of Conservation to restore authentic Nature as it was in 1840 (O’Conner, Overmars, & Ralston, 1990; Wilson, H.D., 1994; Clarkson, 2003).

Lesson 5

Lesson 5 treated the Māori spiritual values of the island. A representative of the Māori village near the island visited the class and gave a talk to the students about the island. The students considered the Māori view of oneness with the land through the notion of whakapapa (genealogy) in which all beings are interrelated and connected in a genealogy (Watenea & Yap, 2015) in relation to contemporary notion of sustainable development (Sitarz, 1993; Groom et al., 2006; Watenea & Yap, 2015). This topic of oneness could be related to a sense of belonging given the emphasis of relatedness through indigenous belief that individuals are connected to the natural world through whakapapa. Through the notion of belonging there is a link to the theme of authenticity. It is arguable that a sense of belonging to a place delivers the belief that place is authentic and conversely the sentiment of alienation or detachment from the world may lead to the sentiment that the world is inauthentic (Menzies & Davidson, 2002).

In this lesson students were invited to understand and translate the Māori view of the land and the importance of the island into French for a French speaking audience. In this way, students considered linguistic connections as well as the overlap between their own world view, that of Māori, and that of the French. This lesson provided an opportunity to meet the *NZC* Principles of exploring cultural diversity, coherence, and “the Treaty of Waitangi⁴ and bicultural foundations of New Zealand” between Māori and Pākehā (European) (MoE, 2007 p 7). The latter Principle provides an opportunity for experiencing Māori culture and acquiring knowledge of Māori language (Te Reo) (see MoE, 2007 pp. 7 & 9). This lesson also demonstrated how the Principle of the Treaty of Waitangi could be approached in this French language class through the consilience Unit of Work (Appendix 1: Lesson 2).

Lesson 6

In the final formal lesson students reviewed the previous lesson in relation to three world views that they were introduced to (Davis et al., 2000). The premodern medieval world view

⁴ The Treaty of Waitangi was signed in 1840 between Māori chiefs and the British Crown. The Treaty enabled colonisation was a promise of Māori self-determination of their lands, forests, fisheries, and all other treasures and resources, including their culture, knowledge, and pedagogy (Glynn, 2015). The Treaty is viewed as the founding document of New Zealand (Durie, 1995), and is viewed as laying the foundation of partnership and biculturalism (MoE, 2007; Glynn, 2015).

involved seeing Nature as an expression of the mind of God, whereas the modern worldview was a product of the Enlightenment, mechanistic and materialist and the ecological postmodern world view stands as the latest in time, but is somewhat intermediate between the former two, whereby humanity was able to see themselves both integrated within, and apart from, the universe (Davis et al., 2000; Clarke, 2014).

The articles contained in the first formal lessons described above were written in French at level suited to Level 8. I drew on grammatical structures and vocabulary that students were expected to know⁵ (NCEA Level 3 vocabulary lists). Vocabulary also included scientific cognates⁶ that students should be able to recognise (Settlage & Southerland, 2012) and notably for their preparation for external assessments at the *NZC* Levels 7 and 8 (NZQA, n.d.). English and French share a very large number of cognates of which many are of Latin and Greek origin (Inkpen et al., 2005). Knowledge of cognates both increases scientific literacy (Nutta, Bautista & Butler, 2011; Burder et al., 2014) but also assists students to see the close overlap between French and English scientific terms (Inkpen, Frunza & Kondrak, 2005; Blattes, Jans, & Upjohn, 2013) and how to use their own language as a resource in developing fluency (Le Blanc, 1989; Tréville, 1990; Nutta et al., 2011; NYU, 2014).

Students were not given a comprehensive academic critique of each topic instead they were encouraged to think and critique the ideas themselves. In this way, students were encouraged to explore something they knew little about but were able to reflect on, as is consistent with transformative learning (see Karpiak, 2000) and Socratic inquiry. In addition, students were encouraged to challenge and debate the ideas with their teacher.

In the remaining six lessons, in pairs, the students prepared a podcast for a popular website dedicated to French visitors to New Zealand. The administrator of the website had agreed to give feedback on the podcasts and to publish them. The students also were informed that they would receive feedback from the French consul, and that they would conduct a tour of the

⁵ Note that vocabulary lists are not recommended under the New Zealand Curriculum (2007) used in New Zealand schools, however vocabulary lists are used widely as proxy syllabi (see East, 2014).

⁶ Cognates are words from different languages which have similar spelling and meaning (Inkpen, Frunza & Kondrak, 2005). Settlage & Southerland (2012) recommend caution in using cognates as some may differ in meaning across languages – these are known as ‘false friends’ (Inkpen et al., 2005).

island for the French public in French. Unfortunately, due to the June 2011 earthquake in Canterbury the Quail Island Reserve was closed and the field trip was cancelled. Furthermore, because of the earthquakes the French consul was unavailable.

An open system transformational learning paradigm requires the teacher to cause sufficient chaos to motivate students to reorganise (Doll, 1986). Because of this, the Unit of Work contains intentional controversy and opportunities for reflection. Both controversy and reflection are to challenge the participants but also to trigger imbalance that may lead to transformational learning (Doll, 1986; Karpiak, 2000). Students were encouraged and provided with the resources of time and materials to reflect on their learning experiences and to write them down in learning journals. Although the journals were confidential, it was hoped that some would be submitted and form part of the data for this thesis. Unfortunately none were submitted. The process, however, of providing the journal conforms to the encouragement of cognitive development through “critical self-reflection” (Csikszentmihayi cited in Karpiak, 2000) In a manner consistent with the *NZC* vision of connectedness (MoE, 2007, p. 7), the teacher encouraged students to relate the content of the lessons to their own lives and thus learn from the experience of the material (Appendix 1).

The ideas that the teacher and students were being asked to process were complex and in particular connections between them were not always obvious; the theme of the authentic posed particular problems for the teacher. Because of this the participants were challenged and engaged in complicated tasks that extended them as individuals and encouraged transformation (see Csikszentmihayi cited in Karpiak, 2000).

The student production was to have been examined by people outside the learning environment, such as the French Consul and the student podcasts were to have been posted on a French tourist website. These additional stakes may have had a detrimental impact on the students’ fluency revealing an unwillingness to make errors and to try.

Data Collection and Analysis

Mezirow (1997) considered that it was through reflective dialogue with another that transformation in the individual is crystallised. I was seeking evidence of learner transformation from the classroom talk data, where participants may have discussed and debated the impact and repercussions of a disorientating dilemma on themselves.

A means of attaining a detailed, rich, and accurate record of classroom dialogue for analysis is through the transcription and interpretation of recorded classroom talk. Conversation Analysis (CA) offers a methodology for the identification and mapping of transformational learning experiences (see Collins, 2013). Conversation Analysis (CA) is a field of applied linguistics founded in the 1970s on the writings of Sacks, Schegloff and Jefferson (Collins, 2013). The objective of CA transcription is to draw out what was said in recording for analysis, and provide the reader with “independent access” to the evidence of identified phenomenon (ten Have, 2007, p. 32).

CA transcription conventions are aimed at showing exactly what was said and how it was said (Mori, 2004). Classroom talk was transcribed using CA notation after Psathas (1995), Jefferson (2004) Cassel (2005), (Ruusuvuori, 2005) and Sidnell (2010). Just less than twenty-four hours of classroom talk were transcribed over the course of the 12 session Unit of Work. I have avoided complete phonetic or semiphonetic spelling in transcription as a means to speed up transcription, and to maintain clarity for the reader who may not be familiar with it. Each utterance or “turn of talk” (Lazaraton, 2003, p. 3), was carefully transcribed accounting for each one tenth of a second. In order to achieve this level of accuracy it was necessary to listen to the audio-recordings at varying speeds and several times. A key to CA transcription conventions is provided in Appendix 8.

Identification of Moments of Change

Change can occur at any point. However, incidents of change occur in context and are often designed by teachers in the planning of lessons. For example, brainstorming usually occurs at K, and collapse occurs at the crest or front loop after exposure to authentic and provocative material. This process has already been discussed in Chapter 3.

Incidents of change were detected in the data set, then considered in context and holistically. They were then and placed on the ACC template (see Figure 4.2). The incidence of change is initially categorised in terms of one of the four phase quadrants it could belong to; that is, conservation (K), collapse (Ω), reorganisation (α) or growth (r).

Evidence of learner transformation was expected in participant talk. Adaptive change learning cycles were identified through the presence of various indicators that foreshadowed or indicated the beginning of a four phase change sequence. Such indicators were:

- laughter: individual unvoiced laughter followed by group collective voiced laughter
- jokes
- irony
- the double bind
- confusion: incoherent explanations, asking the teacher or peers for clarification
- debate/discussion
- brainstorming
- a-ha moment
- expressions of epiphany

Once isolated, the indicator as the beginning of change was verified by searching the transcript around that time for other aspects of the cycle. The moments of change in were transcribed and numbered in chronological sequence. The extract was represented graphically as a numbered box, and then plotted on the ACC template (see Figure 4.3 below).

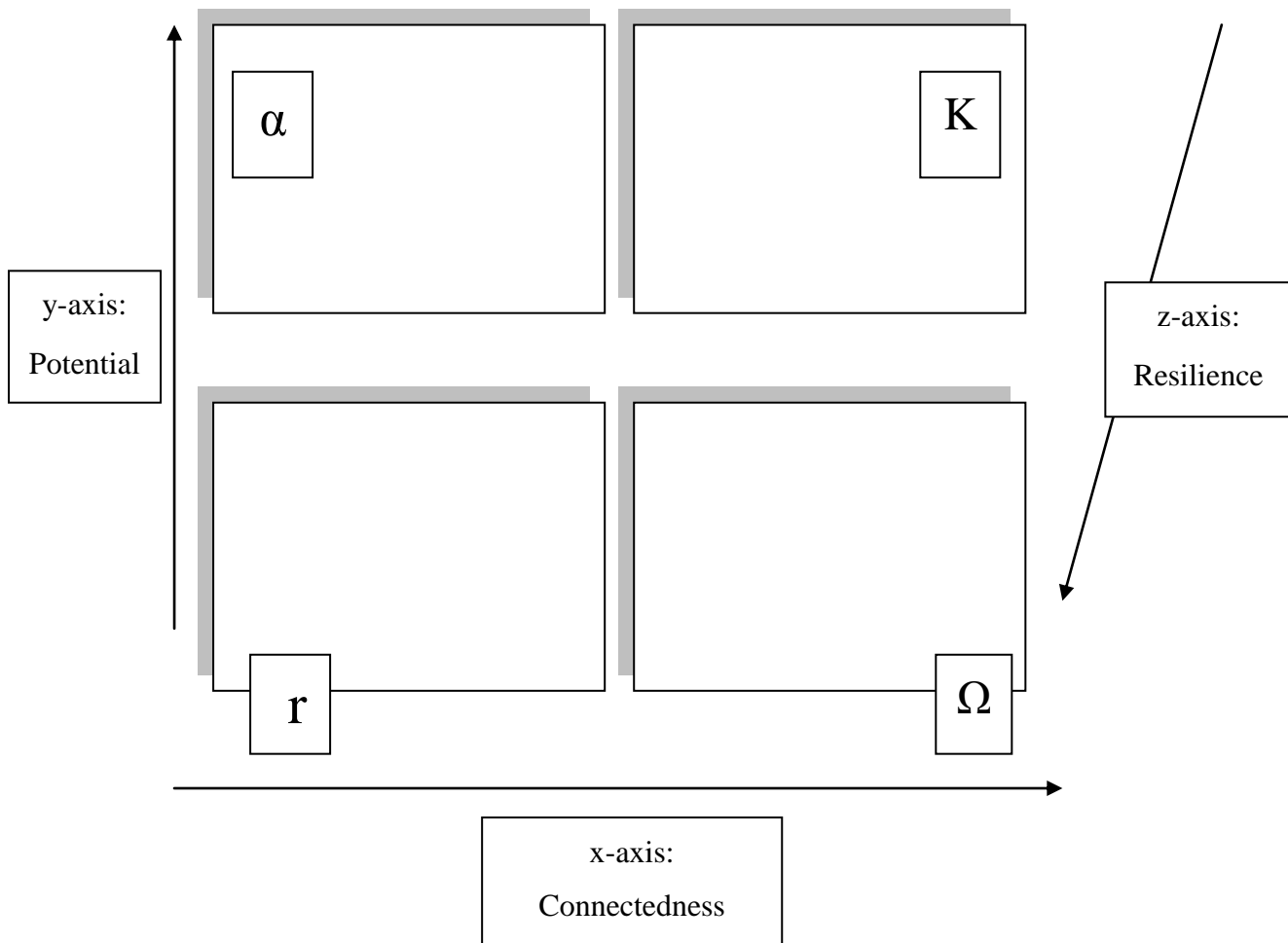


Figure 4.3 Template of the ACC along with the three dimensions (see Chapter 3 for details). Moments of change in the form of numbered boxes that represent transcript extracts were plotted in respect to their possible position on the cycle in relation to the three dimensions (see Chapters 5 and 6).

Supplementary Data for Triangulation

One of the main goals was locating transformative learning events and then mapping their development onto the ACC. The central assumption in the questionnaires was that whatever students found transformative they would include it in their in their post-unit questionnaires. This information could then be triangulated with data from audio recording and learning journals if they had been available.

I wanted to reduce the possibility of students simply saying what they thought I wanted to hear, or conversely having students say the very opposite in order to be simply contrary⁷. The questions in the questionnaires were designed to be as open as possible to give students the opportunity to say what they thought about the stimulus material with a minimum of prodding. Most questions were open and students were encouraged to take their time in answering. They were also encouraged to answer privately and to not be influenced by others.

Copies of the questionnaires can be found in Appendix 4. The objective of the pre-unit questionnaire was to establish a student profile that included a baseline of their beliefs and values relating to Nature, Society, and the French. The questionnaire was divided into six parts. I provide a brief outline of the type of questions and their purpose in relation to the Lessons in the Unit of Work:

- a) Personal details: In this section students were invited to give their name, age, ethnic group, and religion. The question about religion related to ascertaining an indication of how they felt about evolution, which is relevant for Lessons 1 and 3.
- b) Learning: This section was aimed at deriving what school subjects students most enjoyed, least enjoyed, and why. I also wanted to ascertain how they learnt, how they studied most effectively, and what distracted them. I asked these questions to gain insight into the kind of learner they were in respect to Gardner's (2008) multiple intelligences.
- c) Conservation: Students were asked how they felt about various animals groups such as reptiles, birds, invertebrates, plants and bacteria. They were also asked about the introduced flora and fauna of New Zealand.
- d) Society: Students were asked how they felt in relation to New Zealand society. They were to indicate the extent to which they felt part of society. These questions related to the theme of authenticity and belongingness discussed in Lessons 2 and 3. Students were invited to compare the relative authenticity of New Zealand compared to French culture.
- e) French: Students were asked to state why they were studying French, what they liked, disliked about it, whether they thought it was useful, and whether they would continue

⁷ Note that in Lesson 9, L5 appears to mock the earnestness of the environmental message after she has been placed in a double bind by the teacher.

studying it. Students were asked about their current skill levels of French writing, speaking, reading, listening, vocabulary, and grammar. I asked these questions to gauge whether students considered their level of French changed in response to the Unit of Work.

- f) Curriculum Integration: Students were asked if they thought there were connections between the sciences, the arts, and social sciences. They were then asked if their teachers (or they, themselves) connections across and within subjects.

In the post-unit questionnaires under the heading of *Unit Review* students were asked four sets of questions intended to reveal key characteristics of each of the four phases of the ACC: reorganisation (α), growth (r), conservation (K) and collapse (Ω).

The most salient and telling point of the Reorganisation (α) phase is the feeling of being confused or stuck. In ecological and social systems it is the crucial point where either the system will recover from the disturbance and continue as it has in the past in another iteration of itself, or whether it will be drawn away towards another and different attractor (Gunderson et al., 2002).

Students were asked to identify where they most felt this sentiment of disorientation/confusion and to describe it. Students were also asked to announce their innovation and the adoption of new ideas and values. They were finally asked whether these new notions had an impact on other areas of study.

The initial questions were put into the four adaptive change categories of α , r , K and Ω . This was done uniquely for analysis purposes and students were not told of the cycle, or of how I would analyse data. As a consequence, the categories should have had no meaning for the students while they answered the questionnaires. As it transpires the categories proved to be an initial and slight impairment to considering student responses. I therefore disregarded the categories and put myself in the position of the student answering the questions. The assignment of categories to the first set of questions could be interpreted as an issue that comes with the deductive approach in which a researcher attempts to overlay a model onto data rather than having the data suggest the model.

Verification of the existence of the ACC as a map of student learning will only be apparent when the evidence for each phase over the development of a certain idea or product is completed. Seen in isolation and as fragments, each phase above (α , r , K and Ω) has meaning

only within itself. The ACC in relation to consilience, is an attempt to unify the fragments of experience and generate coherence in student behaviour over time; in this sense unifying knowledge of the student experience in this case study.

Learning Journals

Learning journals were issued to each student. Each student was given an instruction sheet in both French and English about what to write and the confidentiality of their entries (Appendix 3). In Lesson 1 the teacher instructed students how to use them. Students were to complete their journals for homework. From Teacher-Researcher debrief notes in Lesson 3 (Appendix 2) the teacher reported that students were lost and were not writing in their journals. It was decided that time would be set aside at the end of the period for students to write in them with instructions from the teacher. Observational notes show that no students brought their learning journal to class but instead wrote in their exercise books or on refill paper. Arrangements were made for their collection. Unfortunately, no journals were submitted. Because students were given the freedom to withdraw at any moment without question, their decision to withhold this data was respected. The withholding of the learning journals rendered the process of triangulation of sources difficult and placed greater importance on other sources of data.

Recording Devices

All participants were aware that they were being recorded. Two Sony digital recorders were used. They were placed in locations close enough to students to capture their utterances but far enough away to be unobtrusive. Two recorders placed in different parts of the classroom enabled reconstruction of conversations during instances of interruption and overtopping. Recordings were downloaded from the device and copied into files on computer hard drive. Copies of each recording were made. Audacity open source software was used for transcription. Each recorded file was converted by the Audacity software.

Supplementary Sources - Ensuring Internal Reliability of Evidence

Data of participant responses to the Unit of Work on French and consilience was first interpreted using the rules of human behaviour revealed through recorded speech machinery that include reciprocity, adjacency pairs, voiced and unvoiced laughter, turn-taking, and so on. To a certain extent the interpretation could be triangulated from other recorded

conversations both from the participant concerned and comments made by another participant. These were used along with observational notes, researcher-teacher-debrief notes and correspondences, pre-unit and post-unit questionnaires. The interpretation of was aided and in some case supported by the use of secondary sources. These included an investigation of the documented impact (or washback) from New Zealand education policy and assessment practices particularly in the study of languages in secondary schools. The practice of triangulation was aimed at bolstering internal reliability of findings.

Interviews and Conversation Analysis

I made the audio-recordings the principal source of data supplemented by participant observations and the aforementioned data sources. I did this for two general reasons. First, as my researcher stance of observer-as-participant (Gold cited in McNaughton Nicholls, Mills & Kotecha, 2013 loc. 6081) I wished to minimise my contact with the students so not to interfere with their experience. I therefore tried to remain as much as possible out of their field of vision, and kept interaction with the teacher to an absolute minimum. This was in accord with the spirit of qualitative research that seeks to record human activity in natural settings (see Silverman, 2013), ethnomethodology (Dingwall, 1997; Hammersley and Gomm, 2008) and conversation analysis (ten Have, 2007). Second, it is argued that the reliability and validity of interviews in qualitative social research are questionable (Dingwall, 1997; Murphy et al., 1998; Hammersley & Gomm, 2008). In the main, individual human social interactions involve attempts to give accounts of experiences that making the individual appear rational to others (Dingwall, 1997). Because of this an interview amounts to an *account* that is constructed by both the interviewer and the respondent to make themselves appear both competent and moral members of their communities (Dingwall, 1997). That is, the respondent will adjust their position in respect to the expectation of the interviewer and vice versa. If the respondent is challenged about some form of negative behaviour it is likely that the respondent will engage in either justification of excuses (ten Have, 2007). Furthermore, in ten Have's (2007) experience interviews serve as poor backups for CA of recorded interactions. This is because "participants may not afterwards 'know' what they have been doing or why" (ten Have, 2007, p. 31). Dingwall (1997) summarises the benefits of participant observation over interviews. He is cognizant that the observer cannot be said to be completely objective in their selection of data; however, the virtue of observation of social interaction is that the researcher is witness to participants forming accounts of themselves to

each other in a natural setting rather than forming accounts to the researcher in an artificial and stressed situation during a formal interview. For Dingwall (1997), the difference between participant observation and interviews is akin to observing an animal in captivity compared to an animal in the wild. He argues that in an interview the researcher can elicit and select the desired messages. In contrast, during observations the researcher is obliged to listen to what the subjects are saying. Dingwall (1997) goes on to assert (and here he is in accord with Garfinkel (1967)) that the interview is a record of the relationship between the researcher and the researched, whereas participant observation is precise documentation of the interaction between the members of a discussion for example.

Some researchers involved in the radical critique of interviews consider that interviews should be avoided altogether for the sake of naturally occurring data. But the majority of published qualitative research uses interviews as a data source. Interviews are considered economical in terms of time and other resources (Dingwall, 1997; Silverman, 2005) and mainstream qualitative researchers consider that the limitations can be mitigated through careful questioning (see Lincoln & Guba, 1985 Merriam, 1998; Trochim, 2008; Yin, 2013). Silverman (2005) argues in support of interviews citing two reasons: methods have no intrinsic value, everything depends on the research topic; and he cautions against the oversimplification of the distinction between natural and contrived methods. He asserts that all natural data is encoded and mediated through field notes, transcripts, and the equipment and where audio recorders are placed in the room.

Hammersely & Gomm make a similar point when they examine the radical critique of interview data and conclude that even though the critique makes valid points it is for them an extreme view. They recommend researchers become aware of limitations of interviewing as a research tool and work to mitigate them rather than abandoning interviews altogether.

Furthermore at School #1 because of the role I had also played as teacher-researcher, it was possible that students felt that they could not be completely open in an interview situation. For example in the audio-recording of Lesson 10, L4 reminded her learning partner of the school code of behaviour that urges refraining from any negative speech regarding a classmate or teacher. This suggests that she might have modified her classroom conversations because of her knowledge that they were being recorded. It is possible that she may have also modified her responses in an interview situation. L3 and L4 both held high responsibilities with the student body as Head Students with L3 as Head of the School, and L4 as Head of

Community Services. In addition, the association I had with the teacher included a working relationship of which the students were aware. This meant that students may have inferred mutual collaboration between myself and the teacher as well as my emotional investment in the teaching material. For these reasons, I considered students would be reluctant to be forthcoming and criticise, if it meant a criticism of either me or the teacher. The research project at School #1 took place immediately after the moratorium on research in schools, that had been put in place after the February 2011 earthquakes, was lifted (ERHEC, 2011). The earthquake series resulted in a loss of teaching time and students may have been disadvantaged in comparison to other students in the country. As a consequence, interviews that were to have been conducted during teaching time were abandoned.

Because of the situation as outlined I considered the arguments against interviews and in favour of participant observation as convincing and appropriate in this context. Information and assessment of the unit was gleaned principally from classroom participant observation, audio recordings and the use of CA. This would reveal the most reliable data of how students responded to the stimulus material. As a result the primary sources of data are the transcriptions from recorded classroom talk, the pre-unit and post-unit questionnaires, and observational notes concurrent with the audio recording of the classroom talk. These sources and their interpretation determine participant responses to the consilience teaching unit.

Summary

This chapter has outlined the practical and theoretical rationale for the research methodology. The aim of this methodology was to respond to the three research questions. These questions are aimed at recording student responses to the consilience Unit of Work; evaluating the use of the ACC as a metaphor for interpreting those responses; and, the identification of enablers and barriers for the teaching of learning of consilience in a senior French class.

This research project received ethical approval from ERHEC (University of Canterbury). All the identified stakeholder gave their approval and were thus in agreement with the aims and objectives of the investigation. The relationships between the actors in the case; that is, gatekeepers, the participant/expert/researcher, participants and the Unit of Work were discussed and summarised graphically.

The Unit of Work was in part predicated on the principles of thematic integrated TBLT (Nunan, 2004; Fraser, 2014). For Nunan (2004) topic-based or theme-based instruction operates as an organising principle for a task-based language teaching syllabus, and has the advantage of being adaptable facilitates connections with a wide variety that can be adapted to meet student needs.

Students were challenged to think critically about texts in French using Freire's problem posing education approach. Students were invited to produce a podcast in French communicating a local ecological restoration project to a French audience interested in travel to New Zealand. The theme of authenticity was used to connect the topics laterally within each lesson and across lessons. The notion of the authentic was outlined and summarised as cultural artefact that facilitates a connection from the individual to the other. A convenient way to imagine authenticity is through the metaphorical pattern of a conduit or tube. The theme of the authentic was connected vertically to biological human nature through its close association with desire for belonging and its association with human need as a social animal to live in groups.

Transcriptions using CA conventions from recorded classroom talk constituted the chief source of data supplemented with observational notes and entry and exit questionnaires. Accuracy in transcription was achieved through repeated listening to the recorded conversations to capture the most likely meaning utterances as they related to student idea development. It was reasoned that these data would provide an accurate gauge of student responses.

In the next two chapters I present the results of the data analysis. Chapter 5 contains the analysis of the development of student L4's the key ideas, and Chapter 6 deals the development of student L5's the key ideas.

CHAPTER 5

RESULTS 1

L4 SINGS «*LA NATURE EST VIVANTE* »

“The elephant is good for thinking,” says one African proverb.

So, too, is panarchy.

(Gunderson & Holling, 2002 Chapter 10, para.1)

In this chapter I present the relevant data, its analysis and interpretation for specific aspects of the L4's learning in her senior French class at School #1 and in Chapter 6, L5's learning is presented. These two students were selected from a class of seven. They were chosen because of the originality of their contributions in class and in their group discussions. Both were demonstrative and their contributions to discussions were readily detectable in the audio recording. The students L3 and L7 were included in the results of L5 to investigate communication between ACCs in the form of revolt.

It was not the objective of this investigation to assess either the student's performance or their language proficiency. The objective was to identify and interpret in terms of the ACC and panarchy the learning of key ideas that the students concerned found compelling.

Achievement Objectives and Learning Outcomes were developed to frame the Unit of Work so that it was both workable, and a demonstration of how the teaching and learning of consilience in a language class could be materialized, as well as to and meet the required curriculum acceptable to the stakeholders at School #1.

The stated Learning Outcomes for the Unit of Work were that by the end of the unit, the students would be able to use the structures and vocabulary to which they had been introduced, and their knowledge of related sociocultural aspects, to communicate about the environment, the creative arts, the connections between the natural science and the humanities with confidence, accuracy, fluency, and increasing flexibility in the specified contexts. Students were invited to complete the task of critically interpreting the Quail Island Ecological Restoration project for a French audience in New Zealand. They produced a two to three minute talk in French in the form of a podcast.

L4 chose to write and sing a song in French for the podcast. Her song was entitled «*La nature est vivante !*» (Nature is alive!). This song constitutes L4's principal idea and embodies the essential responses to the theme of consilience in the Unit of Work and her response to the integrated learning task. L4 considered that her song encapsulated her understanding of the Unit of Work. This chapter deals with the development of L4's song. I have traced the development of the key ideas in her song as extracts from the relevant transcript data. These data are supported through triangulation with supplementary data sources and interpreted through the relevant literature.

This chapter is structured following the phases of the ACC: conservation, collapse, re-organisation and growth/renewal. L4's learning is summarised graphically in Figure 5.1.

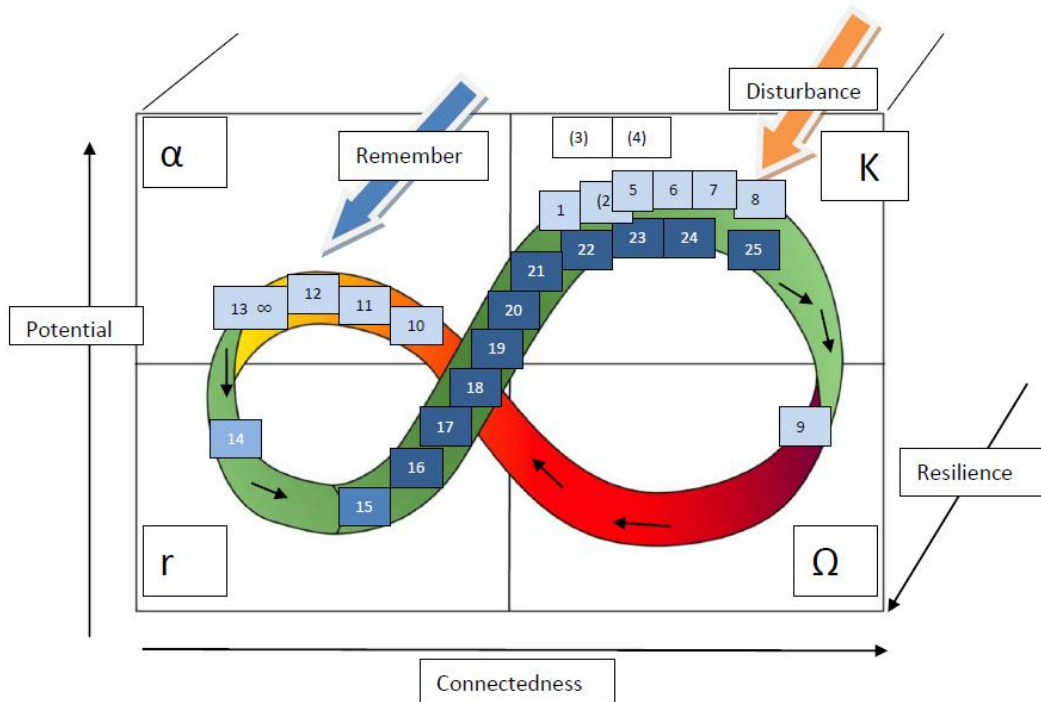


Figure 5.1 Steps in L4's learning in the form of a song entitled *La nature est vivante !* (Nature is alive!).

Each number in Figure 5.1 represents a response or responses contained in extracts from the tape scripts involving L4. The extracts for this chapter can be found in Appendix 8. The numbering is of the extracts in Figure 5.1 is chronological. The extract boxes are shaded darker as they leave the back loop and proceed from r to K. Extract 1 is taken from the earliest stage in Lesson 1, and Extract 24 is taken from the post-unit questionnaire completed after Lesson 12. The infinite sign in the box for Extract 13 in the α -phase signifies a micro-ACC occurring as nested within the overall figure eight episode. The bracketed figures outside the cycle indicate information from the teacher or peers that are important but do not appear to have an impact on L4. In those instances they may have been filtered through bias, prejudice, or through poor cognition. Extracts 1-14 all occur in Lesson 1. The remaining extracts are drawn from Lessons 6-11 where students worked in pairs to compose their podcasts. The large yellow arrow indicates a probable moment of disturbance that triggers the collapse. The blue arrow signifies ecological remember, the form of input in the form of feedback from the teacher, peers, and the texts.

Section 1: Conservation Phase (K₁) - Pre-Disturbance: Extracts 1-8.

Extract 1

Context.

In Lesson 1, students delivered the French homework they had attempted over their holiday break. The teacher spoke French throughout this extract. There were seven students in the class. Students responded in French if they were able. The purpose of this section of the lesson, and with the rest of the lesson was to fulfil Ellis Principle 8 of the NZC for Learning Languages (MoE, 2007 Wall chart; Ellis, 2005); that is, to provide an opportunity to interact spontaneously in the target language. What does the extract show?

In the following passages I describe in detail what happened in Extract 1. This is followed by an evidence-based interpretation informed by relevant literature. I begin with an analysis of each student's contribution to the discussion on their first impressions of the concept of courtly love.

I then analyse L4's conceptualisation of courtly love because that is the topic she chose for her podcast. Lastly, I discuss the reaction of the class to her response which she gave in English.

L6 said in French that courtly love was like the love Shakespeare wrote about (Lines 8-9).

L5's definition L5's definition which she uttered in French (Lines 14-26) was syntactically and grammatically correct. Her pronunciation was accurate although she stammered over the pronunciation of *courtois* (courtly). In terms of content she said she did not know what *courtois* meant, and that she thought courtly love was "love that is a little old" (Lines 14-26). Students responded with voiced laughter. The teacher added, « *Pourquoi pas ?* » (Line 29), which can be translated as: why not?, why shouldn't you (Robert Dictionary of French), for what it's worth, or, if you want/like (WordReference.com).

The teacher invited L4 to speak (Line 29). L4 said she could not write a definition in French because she did not know something (Line 31). The teacher said that it was alright (Line 32).

L4 gave a much longer and animated definition than the previous two students but in English (Lines 34-42). Her definition was interrupted by voiced laughter from the class (Line 33). She

said courtly love was romantic courtship and in contrast to short term sexual relationships which she calls a “one night stand” (Line 38). L4 ends her description with a rising and playful intonation and a sniff (Line 42). The teacher praised her definition (Line 43).

L5 responded quietly that she could not say in French what L4 had said in English (Line 45). L2, who was partnered with L5 (Appendix 5: Participant Profiles), agreed with unvoiced laughter (Line 46); this was followed immediately by loud voiced laughter from L5 (Line 47).

L3, who was the school head girl at the time (Appendix 5: Participant Profiles), responded without waiting for the teacher’s invitation with an initially louder, much slower, and even shorter definition in English of that of L6 and L5. L3 said that courtly love was love in medieval times (Line 48). Immediately following L3’s response, L1, who was partnered with L4 (see Appendix 5: Participant Profiles), uttered a three-syllable voiced but closed mouth laugh. Her laugh is (Line 50) reminiscent of the children’s taunting call or song ‘Na-nana-naa-nah!’ (‘nɜ:’nɜ:nə’nɜ:’nɜ:’).

The teacher then invited L2 to contribute (Line 52). L2 said in English that she had not written anything but that she agreed with L3’s answer (Lines 53-54). L2’s response evoked voiced laughter from the students (Lines 54-57).

On being invited to speak by the teacher (Line 58) L1 gave her definition mostly in French (Lines 61-75) interrupting herself to ask for assistance from the teacher in English (Lines 63). L1 said courtly love was an out dated form of love. In both French and in English she said that she had almost no idea what courtly love was, but she believed it was an outmoded idea.

L4 described courtly love as reminiscent of a more romantic form of courtship that she calls, “the cute way of winning over a person” (Line 35) with one’s “charm” (Line 41). Note that her use of the word “charm” is slow and she extends the vowel and ends with falling intonation. She refers to courtly love as “traditional” (Line 36) and reminiscent of courtship both in “history” (Line 34) or going back just sixty years (to the fifties) (Line 35) which she contrasts with “texting or one night-stands” (Lines 36-38). Her comment about “texting” and “one-night stands” evoked voiced laughter from the class (Line 39).

Discussion of what it might mean.

As evidenced in the transcript (Extract 1), L4 gave the longest and most detailed account of courtly love not in French but in English. Overall, this extract indicates that students did not have the level of oral French to discuss the unfamiliar topic of courtly love in French.

L4's conceptualisation of courtly love occurred in the context of laughter and other comments. The fact that L4 did not try to deliver her description in French and yet received praise from the teacher revealed a number of issues. The extract raises questions about what students were realistically able to do in French, in relation to what they were expected to do both habitually in class and for the Unit of Work. Students in Extract 1 appear caught in what Bateson would consider to be a double bind (1978); that is, where whatever action taken is the wrong one. If students speak about the topic of courtly love in French using their actual level of French their explanations are brief and inadequate. If they describe courtly love in English their ideas are clear and accurate but fail to meet the objective of interacting in French.

Extract 1 provides evidence of how the students dealt with this situation. Extract 1 shows how the students may have attempted to resolve the double bind largely through a teasing process that involved irony, laughter, face saving mediation, taunting, and non-cooperation. In the following passages I elaborate on the apparent process. I briefly illustrate student reactions to the laughter responses with evidence from the extract. To begin with I discuss briefly the nature and meaning of teasing.

The purpose of teasing is to “socialize each other, enter into and maintain relationships, and negotiate group membership and social hierarchies” (Keltner, et al., cited in Heerey, Capps, Keltner & Kring, 2005, p. 55). The aforementioned authors define teasing as “a provocation that comments on something of relevance to the target” (p. 55). The provocation (criticism or hostility) can be verbal, such as an insult or a comment on deviant behaviour. In teasing the potential of hostility is reduced through “playful gestures or ‘off-record’ markers” which indicate that the remark should be taken in the spirit of play. Off-record markers include: verbal comments (e.g., just kidding), facial displays (e.g., smiles), grammatical devices (e.g., repetition, exaggeration), and prosodic cues (e.g., sing-song voice) that signal that the provocation is not entirely serious. The implied meaning of the act of teasing lies in the juxtaposition of the literal provocation and the non-literal meaning (Heerey et al., 2005).

Teasing that involves provocation and playful gesture is prosocial and is intended to comment and correct some facet of the target's social behaviour (Heerey et al., 2005); that is, it appears to have overlap with Bergson's conception of laughter as a kind of social chastisement for socially maladaptive behaviour (Bergson, 1940/1999).

L5 said quietly and rapidly in response to L4's detailed English definition of courtly love, "I don't know how to write that in French" (Line 45). Her literal meaning was probably self-deprecating highlighting her own lack of learning and competency in French. Her self-deprecation was most likely pretence (Lesley, 1987) which provided much of the ironic and joking tone of her comment. It is for the teased (that is L4) to decode L5's pretence (Clark & Gerrig, 1984). L5 followed her comment with loud voiced laughter that immediately followed the negative unvoiced laughing agreement of L2 (Line 46). L5's laughter (Line 47) was arguably a prosodic off-record cue that she was just joking (Heery et al., 2005). L5's non-literal meaning appears to be that it was unfair that L4's use of English should have been authorised (Line 32 T: that's alright), and that her explanation should have been praised (Line 44), whereas her explanation though simple and incomplete was given in French but did not appear to be appreciated by the teacher. Note that the teacher responded to it saying "*Pourquoi pas?*" or "Why not?" (Line 29), and students laughed (Line 33). It appears that for L5, L4 broke the rules and was rewarded for it. L5's comment (Line 45) and its support from L2 (Line 46) may have been directed both at L4's and the teacher's behaviour in an attempt to highlight and redress the injustice (see Heery et al., 2005). In this way, L5 and L2 appeared to agree that L4's behaviour deviated from an agreed social norm which was that they had to communicate their ideas in French.

The sequence of events just described could also be interpreted from the perspective of face threat (provocation or aggression) and face support (rapport or solidarity) (Arundale, 2010; Haugh, 2010). Face threat comes from L5 and L2 who taunt L4 for speaking in English. This taunt appears to be mitigated by L3 who gave a simple explanation in English and is arguably face support for L4. L3's face support for L4 is repeated from L1 who taunts L5 and L2 with a laugh that is reminiscent of the children's taunting call or song "Na-nana-naa-nah!" ('nɜ: 'nɜ:nə 'nɜ: 'nɜ:) which Wells (2011) suggests is "a paralinguistic way of crowing 'you can't catch me' and showing defiance or provocation."

In Line 52 the teacher asks L2 to contribute. After having heard L3's brief and slow definition L2 says in smiling speech followed by loud voiced laughter, "hmm yeah I haven't really written anything but I'll say that as well." (Line 53). At this point, it appears that because the norm of speaking French has been relinquished, L2 decides to reply in English without attempting to offer her own definition of courtly love in French, telling the teacher while she is laughing that she will say what L3 has said. At this point L2 does not participate in either French or English. L2 may have been displaying an act of non-cooperation. She appears to be questioning in a teasing manner the utility of the activity if everyone speaks English, and if no-one can contribute adequately in French. It is conceivable that L2 has exited a double bind that the Unit of Work brought forth, such that any response is met with punishment. In the context of Extract 1, L2 may see that to give an inadequate answer in French brings about social chastisement through laughter from classmates and a tepid response from the teacher (Lines 28-29); and similarly, a detailed answer in English will also engender teasing (Lines 45-47). Either way is unsatisfactory and results in a kind of punishment. L2 exited the present situation by not participating.

The double bind evident in Extract 1 may be indicative of a wider issue in this language class: there was a discrepancy between the expected standard of fluency in French as determined by the *NZC Proficiency Descriptor* for unfamiliar topics and the observed level of spoken French of the students. L2's apparent exit strategy of non-participation could only work momentarily for this particular exchange between the participants. Her action of non-cooperation signalled what may be construed as a protest against being asked to do something that she had not been given the language resources to complete successfully, but also her inaction could be interpreted as a sign of a more general situation of the way in which French was being taught in this class, and possibly throughout New Zealand.

Plotting L4's beliefs about courtly love on the ACC.

It is arguable that L4 saw courtly love as morally exemplary in relation to contemporary courtship practices that involve texting and short term sexual relations. L4 declared herself as Christian, and showed an interest in religious and philosophical subjects (Appendix 5 Participant Profile). From the evidence, it is unlikely that L4 changed her beliefs through exposure to courtly love but instead she may have seen courtly love from a Christian perspective. In this sense the seriousness of courtship under courtly love may have endorsed

and supported her own views about human courtship. In this way she may have assimilated her understanding of courtly love into her world view. As she has declared her point of view openly and excitedly there is the possibility of challenge and difficulty for her to depart from her view without backing down and thus losing face in some way. This gives her conception of courtly love low resilience or brittleness. It is conceivable that the teasing, possible loss of face that L4 endured for speaking English as well as the presence of the double bind may have contributed to weakening her confidence in dealing with this topic. For these reasons I have placed Extract 1 for L4 at the crest of the front loop which depicts a mature and completed idea that is vulnerable to sudden collapse and change (Figure 5.1).

Extract 2

Context:

Extract 2 follows immediately on from Extract 1 and represents the first part of the *expert story*; that is, the teacher provides a definition of courtly love in English that precedes further homework and the class readings occurring later in the lesson.

What does the extract show?

The teacher praised L4 in front of the class for her interpretation of courtly love that corresponds to the expert story contained in the dictionary definition. This may have acted to reinforce L4's conceptualisation making it more rigid. The teacher explained in French that students should consider courtly love as emanating from the medieval premodern world view that sees continuity between human behaviour, Nature, society and God. The teacher made the point that the premodern differs from the modern view in which humanity sees itself as exterior to Nature. She referred to the theme of the environment in relation to the otherness of Nature and mentions the Quail Island ecological restoration project as the objective of the Unit of Work. There is no evidence in this extract that L4 responded to or understood the teacher's attempts to connect courtly love and the environment which she gave in French. Later evidence confirms that L4 did not understand. L4 declared in Lessons 6 and 9 and in her exit questionnaire that she was confused about the connection between courtly and the environment throughout the Unit of Work.

Discussion of what this might mean.

There are two factors of importance. L4 received praise again for her contribution in Extract 1 and for her contribution in this extract (Lines 97-102) both of which were in English. It is highly likely that L4 did not understand the explanation of connection between courtly love and Quail Island given in French. As became evident in the student group discussion (Extracts 8-10), in comparison to her classmates L5 and L6, L4's views were rigid and she resisted the arguments presented in the texts that contradicted the teacher's conception of courtly love. As young people prefer to imitate a reliable-credible person and look for cues to determine reliability (Poulin-Dubois et al., 2011; Wilson, 2012; Blackmore, 1999), the praise may have acted as an indicator to L4 that she was congruent with the teacher as authority figure and mentor. The praise given to L4 could have led to an initial ossification of her understanding of courtly love, which could make her understandings inflexible and more brittle. Further, the praise L4 received confirmed to her that it is acceptable to communicate her ideas in English even though this is contrary what she had understood were classroom expectations and also contrary to the Curriculum Proficiency Descriptor and Achievement Objectives for her level of French. It is of note, however, that L4 held the teacher in high esteem (Appendix 5: Participant Profile).

Plotting L4's beliefs about courtly love on the ACC.

The teacher reinforced L4's understanding of courtly love and her attempts to communicate her ideas in English rather than French. L4 did not understand the French explanation of the proposed connection between courtly love and the environmental theme of conservation. It is possible that the added information, although probably not understood, could add to discomfort with her feeling that she is out of her depth, which could make her understanding less sure or rendering it brittle. On Figure 5.1 I have therefore placed Extract 2 as (2) further to the right of Extract 1; the brackets signify that it is not clear whether the point is made or has affected L4.

Extract 3

Later in the lesson the students were asked to review two Medieval art works: The Flanders made 16th century tapestry: *The Lady and the Unicorn* along with 13th century ivory casket carving, *The Siege of the Chateau of Love* (Appendix 1) that they had been given for

homework. The artworks show the elevated status of lady in the courtly tradition. This phase of the lesson was conducted entirely in French. L4 did not participate and there is no evidence to suggest that she understood the discussion.

Extract 4

Context.

Continuation of the expert story where the teacher explains in French that love is part of the medieval world view and that there is overlap between courtly love and animal courtship.

What does the extract show?

The teacher conveyed the message that love was a part of the medieval world view, and that courtly love has overlap with animal courtship (Lines 1-7). The teacher hoped that the students would agree with her (Lines 11-12) when she said *je vous pousse de me joindre sur ma vision.*¹ (I am encouraging you join me in my point of view). It is not clear whether the teacher's attempt to persuade the students to share her view of courtly love refers to the aspect of a common process or in her negative synopsis of courtly love that occurs in Extract 5. Nevertheless, students (L6) and (L5) appear to have a moment of realisation (Lines 18-22) where they may see the connection of courtly love with the theme of the environment and nature.

Discussion of what this might mean.

At this point is once again not clear whether L4 understood. Extracts 9-10 reveal that she probably did not understand and required her peers L5 and L6 to explain the connection between animal courtship and courtly love as a shared process.

¹ The phrase makes sense but the wording is unconventional and likely to be the teacher's only construction. The global meaning is probably that she is encouraging the students to agree with her that courtly love and animal courtship share a similar process. However, she could also be referring to her view that courtly love is bizarre which transpires in extract 3. The phrase should read: *Je vous encourage à être d'accord avec moi.*

Plotting L4's beliefs about courtly love on the ACC.

Because there is no evidence at this stage of the lesson that L4 understood the teacher's messages about courtly love I have plotted Extract 4 outside and above the front loop (see Figure 5. 1).

Extract 5

Context.

The teacher continues on with her expert story and lists the stages of courtly love in English reading from a Wikipedia source presented as a PowerPoint slide.

What does the extract show?

The teacher cites the stages of courtly love from a PowerPoint slide. She reads swiftly through the list. She does not pause or make time for students to comment on the list.

The spiritual aspects in the second stage of courtly love (Lines 3-5) that pertain to devotion and fidelity were not emphasised. In addition, even though in the previous extract she had advocated a common process between animal courtship and courtly love (Extract 4 Lines 13-24) she did not make this link in relation to: a) fidelity (Lines 3-5) and the biological necessity for stable pair bonding for child rearing were not included; b) the lover performing heroic deeds of valour to win the lady's heart and facultative consummation of their relationship that followed (Lines 22-24), and the process of female directed sexual selection.

The teacher commented on and paraphrased some stages of the process that either required clarification or provided an opportunity to make fun or ridiculing of the suffering of the lover which elicited laughter from the students (Lines 8-21). In the last utterances of this extract the teacher claimed that the courtship involved subterfuges that included hiding. The purpose of such subterfuge was to render the courtship more exciting (Lines 25-28).

Discussion of what this might mean.

In this extract the teacher spoke English throughout. She described the stages of courtly love in a somewhat mocking way. There is no evidence that L4 followed the earlier French explanations of courtly love. If this were the case, L4 missed the core underpinning connections between courtly love, nature, and the environmental theme that the teacher has

already developed. She probably understood the teacher's mocking rendition of the stages of courtly love presented in this extract which omitted the connections with animal courtship and the spiritual.

Plotting L4's beliefs about courtly love on the ACC.

The teacher's apparently mocking rendition of the processes of courtly love clashes with L4's romantic and nostalgic vision that she presented in Extract 1. It is unlikely that L4 understood the French explanations in the earlier extracts that connected courtly love to animal courtship and the theme of the environment. Instead her view of courtly has been added to and may have become jaded with the result that it has less value than she first anticipated. In this way the potential for change is greater, and the resilience to change is lesser and her notion is now greater connected to another, but negative, dimension. For these reasons I have plotted Extract 5 next to Extract 2 at the crest of the front loop in Figure 5.1.

Extract 6

Context.

This extract follows on directly from Extract 5. The teacher describes an offer of a book project on the courtly romance of the twelfth century couple of French philosopher Paul Abelard and his student Heloise. The teacher's description appears ironic and mocking and is consistent with Extract 5. The teacher's discourse supports her argument that courtly love is risible and contrasts with L4's romantic and nostalgic view of it.

What does the extract show?

The teacher described in English an offer of a book project she was to write with her former PhD supervisor (Lines 29-30). The project was to deal with the courtly romance of the twelfth century couple of French philosopher Paul Abelard and his student Heloise although these details were not included. According to the teacher the book was about a husband and wife who decide to live apart to cultivate their passion (Lines 38-42). This is for the teacher a classic example of the "unusual" nature of courtly love (Lines 48-49). This decision to live apart illustrates the strangeness of courtly love literature especially in relation to the desire to cultivate love in absentia (Line 48-49) (see de Rougemont, 1956). Her reference to her book project appears to be triggered by the word "exciting" (Line 39) that she used to describe the

stage in the courtly process whereby lovers would engage in subterfuges to keep their romance hidden. The subterfuges she claimed were designed to make their love more “exciting” (Line 43).

At the beginning of the teacher’s discourse L4 interrupts the teacher to ask if she managed to evade the project (Line 31). This may indicate that she was familiar with the book writing project and her teacher’s desire to side step it. The teacher responded in laugh speech that she did not go through with the project (Line 33), and the class responded with loud voiced laughter (Line 34). The voiced laughter may indicate that the teacher had probably discussed the project with the class. The humour may lie in the irony of their teacher as the authority figure and mentor attempting to evade study. In Line 35 where the teacher referred to me as the researcher, in saying that she hoped I would not play the recording to anyone at the university. A student responded with laughter. Students responded with voiced laughter (Line 36), indicating that they were engaged positively with the teacher. The teacher’s description involves her admission to this class that she successfully evaded the project. Her telling of the story appears light hearted, ironic, and elicits laughter from the class. The ironic and mocking tone is consistent with her treatment of the process of courtly love conveyed in Extract 5. There may be a thematic overlap with the notion of subterfuge raised in the extract in relation to the courtly lovers hiding to avoid jealous husbands and the subterfuge the teacher suggests she used to avoid the book project. This continuity possibly adds to the humour that the students find in her discourse.

Discussion of what it might mean.

From personal communication with the teacher, the proposed book project was the story of Pierre Abelard and Heloise. The story is non-fiction. It tells of the relationship between the acclaimed twelfth century philosopher and teacher Pierre Abelard (1079–1142) and his pupil Heloise (c.1100-) niece to Fulbert canon of Notre Dame cathedral. The teacher’s rendition and synopsis of their lives together appears incomplete and to be a caricature. It is possible that the teacher was trying to persuade the students to see courtly love as unusual. Her delivery of the word “unusual” was saucy (Line 48), and may suggest that she considers that the courtly love to be somewhat sexually deviant. If this is so, her reading of the courtly love literature aligns with such scholars as C.S. Lewis’s 1936 study of courtly love in *Allegories of Love* and Denis de Rougemont’s (1956) *Love in the Western World*. This view, however, that

courtly love is entirely a cultural invention is controversial and Dronke (1965), Boase (1978), and Monson (2011) argue that courtly love is universally possible.

The teacher's description of the offer of the book project on Abelard and Heloise adds support to the impression that the teacher held a negative view of courtly love. This view may have further deepened the contrast between L4's positive view of courtly love that she described in Extract 1.

Plotting L4's beliefs about courtly love on the ACC.

The teacher's light-hearted and ongoing mocking interpretation of courtly love through her telling of the romance of Abelard and Heloise continues to clash with L4's romantic and nostalgic vision evidenced in Extract 1. Her view may continue to erode in resilience, through continued growth in potential of the inflammable detritus of the negative criticism of courtly love that is increasingly connected, this time to the specific example of the teacher's book project and the reasons why she declined to participate. For these reasons I have plotted Extract 6 adjacent Extract 5 and closer to the collapse point of the front loop of the ACC (Figure 5.1).

Extract 7

Context.

Students have been put into two groups and assigned half of the text entitled, *Le Mystère de l'Amour Courtois* (The Mystery of Courtly Love). L4 was working with L5, L6, and L7 on Part 2 of the text. L4 led the reading. The text presented two hypotheses about the origins of courtly love. First, the text postulated that courtly love was a product of the medieval premodern world view where Nature was seen as an expression of the mind of God. That is, there was a oneness between the mind of the individual, Nature and God (Davis et al., 2000). Under this world view, meaning and moral messages were communicated to humans through observations of animal behaviour accessible to those observant and open to them (Yamamoto, 2000; Davis et al., 2000). From this, it was hypothesised that courtly love may have emerged from the imitation of animal courtship. Second, in the text I hypothesised that given the biological investment and Darwin's inference that women drive the course of human evolution through sexual selection, it is possibly not surprising that there should not exist such excessive adoration of women in the form of courtly love (Appendix 1: Lesson 1).

L4 led the reading of Part 2 of the article. Students took turns to read the text out loud in French sentence by sentence. The teacher and the French assistant present that day were circulating and helping with the translation. At the end of a sentence the students together translated it into English. Note that L4 and her classmates did not comment on the first hypothesis during the translation.

What does the extract show?

Extract 7 records students reading collectively part of the one sentence long paragraph 6 of Part 2 of the text shown below:

« Tout compte fait, puisque l'homme doit tout aux femmes, l'adoration 'excessive' de l'amour courtois semble peut être, raisonnable. »

Overall, since man owes everything to women, the excessive adoration of courtly love seems to be perhaps reasonable.

In this instance L4 translated the core of the one sentence long paragraph #5 underlined as above. She did not read the paragraph in French and then translate it into English as had been done in the earlier parts of the text, instead she translated it directly into spoken English with the exception of the last word *raisonnable*; that is, reasonable. L5 and L7 translated this last word directly into English in overlapping speech (Lines 3-5).

L7 began to translate the word *raisonnable*, uttering the first syllable of “reasonable” (Line 3). There is a micro-pause, and L5 at that moment utters the same word the same word in unison with L7 (see Extract 7 Lines 4-5). The rising intonation of the overlapped the word “reasonable” of uttered seems positive and may suggest mutual understanding and agreement. L4 did not utter the word “reasonable”, but said “a’right” (Line 10) after a pause of 0.3 seconds that is interrupted by a pen click (Lines 7-10) .

Discussion of what it might mean.

The extract could indicate that students L6 and L7 did not see courtly love as unusual as the teacher proposed in Extract 6 (Lines 48-49), but appeared to agree that it was reasonable. This may have been a moment of epiphany for L7, and a moment of reinforcement for L5. In this segment, unlike her classmates, L4 did not utter the word “reasonable” but instead said, “a’right” (Line 10) last of all. This might suggest that she agreed with the translation and was

ready to move on to the next phase of the text, but that she was reluctant to agree that the argument was reasonable.

L4 probably believed that her understanding of courtly love as romantic and nostalgic was correct having received approval for it from the teacher both in Extract 1 and in Extract 2. However, the teacher's view of courtly love as revealed in Extracts 4 and 5 suggests that the teacher views it as strange and worthy of ridicule. This conflicting information may have confused L4. This confusion could have manifested itself in terms of an initial blockage vis-à-vis the contents of the text, and in a position of disaccord with her classmates (L5 and L7) who appeared to have understood the reasoning both from the text (Lines 3-5) and from the teacher's lecture in French where she linked the process of animal courtship to courtly love (Extract 4 Lines 9-24).

Plotting L4's beliefs about courtly love on the ACC.

Given this possible confusion L4's idea structure or her conceptualisation of courtly love may have increased in brittleness is increasingly vulnerable to collapse if threatened. For this reason I have plotted Extract 7 to the right of Extract 6 and closer to the point of collapse (Figure 5.1).

Extract 8

Context.

In the next phase of the lesson this group of students answer comprehension questions and critique the text. L4, L5, and L7 translate question 2. L4 led the translation and said she disagreed with a connection between Darwin's notion of sexual selection and courtly love.

What does the extract show?

The students began to answer question 2 of Part 2 of their handout:

Selon l'auteur de l'article il y a peut-être un lien entre l'amour courtois et la sélection sexuelle de Charles Darwin ; explique ce lien. Est-ce que tu es d'accord ? Explique ta réponse.

According to the article there is perhaps a link between courtly love and Charles Darwin's sexual selection. Do you agree? Explain your response.

L4 continued to lead the reading and answering questions. The students worked in close collaboration completing each other's lacunae. Notably L5 and L6 completed the lacunae of L4 (Lines 8 & 10). Note that L4 did not say “sexual selection” or “Charles Darwin” in this instance.

Note that in Line 3, L4's pronunciation of “between” is quiet, slow and drawn out. In the recording it sounds croaky; it is as though she has difficulty saying the word. L4 did not say “sexual selection” but it was L5 who interrupted her 0.2 second lacunae in Line 8 with that phrase which she said while yawning. The utterance of “sexual selection” was followed by a 0.8 second silence (Line 9). Next, L4 introduced her disagreement with irony and unvoiced laughter, as though to say she was completely unconvinced (Lines 15-22). From her largely unvoiced snort laugh that followed her feelings about the proposed link were probably negative. She highlighted her disagreement reading out the phrase, “do not agree” slowly and with pause between each word (see Line 20) once she had written it down.

Discussion of what it might mean.

L4's principal contributions in this extract to this group discussion were that she identified that the question 2 was the author's opinion, and that she said that she did not agree with it. She hesitated and allowed her class mates to pronounce the name Charles Darwin and the term “sexual selection”. This may signify that she was uncomfortable with the topic of evolution.

Plotting L4's beliefs about courtly love on the ACC.

L4's disagreement about the connection between courtly love and biology makes her appear intransigent but without argumentative support. She was at risk of losing face if challenged. In this way L4 has further entrenched herself conservation (K) phase making it difficult to change her mind without losing face. L4 may have entered at this stage a rigidity trap (see Chapter 3).

In summary, based on L4's transcript evidence, her learning experiences during Lesson 1, appear to fit within the K quadrant of the ACC as plotted on Figure 5.1. The next sections present transcript evidence for L4's Lesson 1 experiences that have been plotted on collapse phase of the ACC in the Ω quadrant (Figure 5.1)

Section 2: Extract 9 - Collapse (K→Ω) - Student Critique of the Expert Story

Context.

This extract follows immediately on from Extract 8. L5 and L6 correct L4's misunderstanding of the text, and assert their agreement with the Darwinian interpretation of courtly love. L4 tried to summarise her understanding on first hearing the corrections of L5 and L6 but her answer was incomplete and confused. This experience may have engendered a momentary loss of face that would shift her into the collapse or release phase.

What does the extract show?

L4 verbalised her disagreement which she appeared to be writing down for the group. Lines 28-30 reveal she believed that Charles Darwin thought there was a link between courtly love and sexual selection. L6 corrected her: it was the author of the text who thought that. From lines 31-53 her peers L5, L6, and L7 explained the textual arguments accurately. L4 did not contribute until Line 50, but her summary of their explanation was incomplete and incoherent. This shows that she did not understand her peers' explanation, nor the text, nor did she follow the teacher's lecture in French.

Discussion of what it might mean.

L4's confusion showed she had not been following the textual argument in neither French nor English. She therefore appeared to disagree with the proposition in the text before she had an understanding of it, suggesting a prejudice. She could have been in a position where she has lost face with her peers.

Plotting L4's beliefs about courtly love on the ACC.

L4 rejected the argument without reason, and showed to her classmates she was confused. Her own view of courtly love and the evolutionary connection (whatever form it took) must have been put in doubt, and set up for a review. In this way, her idea structure could be considered to be in a state of collapse. For this reason I have plotted extract 9 at the bottom of the front loop in the Ω quadrant (Figure 5.1).

Section 3: Reorganisation (α)

Continued Student Critique of the Expert Story: Extracts 10-14

Extract 10

Context.

This extract follows immediately on from Extract 9.

What does the extract show?

L6 disagreed and corrected L4's confused and incomplete understanding of the link between courtly love and Darwinian notions of sexual selection (Lines 61-62). L6 said that the link between them is that in both sexual selection and courtly love "the females have the final say". One of the students (L4 or L7) attempted unsuccessfully to interrupt and to contradict L6 (Line 63) with a fragment of a statement that commenced with the third person masculine pronoun "he- he-", that probably refers to Charles Darwin. L6 went on to paraphrase herself by saying that "the guy asks the girl" (Line 67) and "the girl can say 'yes' or 'no' " (Line 69). L7 supported L6 with a near paraphrase in Line 68 uttered in unison with her. L4 did not interrupt again in this segment, nor did she take advantage of the repeated pauses in L6's explanation that occurred in Line 63 (0.3 seconds), Line 66 (1.3 seconds), Line 67 (1.7 seconds). Instead, it was L5 who supported L6's argumentation with agreement in Line 70, and Line 74 when she calls L6's the decision making role of the female as "a bit cute". L4 agreed with L5 that it was cute "because the woman has 'cos the female has" (Line 76) which L5 added to with "more at stake" (Line 77) and L4 completed with the sentence with, "keepin' the line going" (Line 78).

Discussion of what it might mean.

L6 corrected L4's confused and incomplete understanding first with a somewhat technical explanation of Darwinian sexual selection followed by a contemporary paraphrase related to dating. The other students in the group agreed with and supported L6 thus isolating L4 who L4 was silent during L6's discourse. L6 appeared to be teaching L4. At the end of the extract L4 appeared to agree, but with L5 assisting her statement. It appeared that L4 had put aside her prejudice which was blocking her understanding.

Plotting L4's beliefs about courtly love on the ACC.

I have plotted Extract 10 in the reorganisation or α -phase of the cycle. This is because L4 had been silenced and appeared completely open to receive what was for her new information in a way that she could understand. In this way L4 was receiving guidance and feedback from her peers; that is, she was drawing on the wisdom (Remember) of the larger and slower ACCs of her classmate's understanding and their relationship (Figure 5.1).

Extract 11

Context.

This extract occurs almost straight after Extract 10. In the interim the students discussed what they would write for their answer to Question 2.

What does the extract show?

L4 then gave a relatively coherent summary and with it her opinion or evaluation. She agreed that in both courtly love and Darwinian sexual selection it is the woman that makes the final decision to have sexual relations. However, she would not accept the proposition without "facts" (Lines 88-90). Note she talks about Charles Darwin's "research" on women and their decision making role in the mating process (Line 86-88), natural selection (Line 97) and evolution (Line 99) using the vocal fry (Lines 86-88). L4 claimed that they did know whether the proposition was "true" (Line 88) as they did not know the "specifics" (Lines 90 & 92); so L5 (Line 91), L7 (Line 94) and L6 (Line 95) stated that they thought the proposition were true. L4 agreed that it is the female who makes the decision but she did not agree that it was related to Darwin's notions of natural selection (Line 97). L5 interrupted L4 and corrected her saying that the author said it was due to "sexual selection" (Line 98). L4 replied that sexual selection was part of evolution (Line 99).

Discussion of what it might mean.

She said that she agreed that the female makes the decision in both animal courtship and in courtly love but that this is not because of evolution. As revealed through her use of the vocal fry she was probably disinterested in evolution as a cause. The vocal fry can either communicate an attempt to sound authoritative (Yuasa cited in Quenqua, 2012) or disinterest and lack of investment in what one is saying (Lieberman cited in Quenqua, 2012). Given her

reticence in regards all things Darwinian it is more likely that she was showing that she considered it lacking in interest for her, rather than that she was trying to sound authoritative.

L4's scepticism of Darwin's theory of the role of the female in sexual selection and Trivers (1972) elaboration of it in evolution is in alignment with Roughgarden et al., (2006). They argued that mate selection can be explained by game theory determined principally by "bargaining and side payments" (Roughgarden et al., 2006). Individuals select each other based on what each other can offer the other. Nevertheless, the attacks are considered minor among scientists but significant for feminist thinkers and philosophers of science (Allen, 2014).

It is arguable that coyness in human female courtship is an epigenetic rule that has been modified by culture and is subject to the environment. New evidence shows that Darwin and Trivers' ideas are more or less a rule of thumb, as there are both advantages in being choosy and in being indiscriminate in mate selection (Allen, 2014). The tension that the students expressed in relation to a lack of coyness in dating could be an expression of the transgression of an underlying predisposition for coyness derived from the biological imperative.

For L4, this extract was a period of debate with her peers. Conditions appeared good for creativity – fertile ground for the exchange and the sorting of ideas. L4 could be corrected without fear of criticism. L4 had been incoherent up until this extract but had the freedom to be so. This showed equitability and positive relations between students. L4 showed openness and listened to the ideas of the others. This phase demonstrated the negotiation of meaning in a group, the importance of group interaction for learning, the role of elder wisdom as recorded in the text. L4 was recovering from her confusion. She saw the arguments and was able to disagree but gave little substantive support for her position. She was progressing towards the back loop of the α -phase.

Plotting L4's beliefs about courtly love on the ACC.

In Figure 5.1 I plotted Extract 11 to the left of Extract 10 because L4 used the affective and information resources available in this way increasing in potential for change through the exhaustion of said resources, and her openness and willingness to discuss suggests a

disconnection from prejudice, and also a resilience to an idea disturbance which could be easily absorbed.

Extract 12

Context.

This extract follows immediately on from Extract 11.

What does the extract show?

L6 said girls ask boys out nowadays (Line 102), and that it was different now (Line 104). L4 agreed that it was “so different” (Line 105). L4 continued to say that there are so many times when a girl (with stress on “so” and “girl”) is obsessed with a boy “((retch))”; that is, she appeared to imitate the sound of vomiting to suggest her nausea at the proposition. Note that from the word “obsessed” to the end of her phrase in Line 107 her voice was croaky. Further, note that she lowered the volume of her speech which eventually became a whisper (Line 107). L6 and L5 responded with unvoiced laughter. L4 responded to the laughter by repeating her imitation of the sound of vomiting. This was received with unvoiced laughter from a student (Line 112).

Discussion of what it might mean.

L6 recognised that the evolutionary model for courtship and the protocol of courtly love where the female is coy is at odds with contemporary dating practice where girls may ask boys out². L4 appeared to show disapproval of contemporary practice notably when it involved a girl who was overtly infatuated with an unattractive boy, through added stress on “so” and “girl” (Line 105), her use of vocal fry (Lines 107) and the imitation of retching (Lines 107 and 111).

Here, L4 contrasted the issue of female coyness with what she had witnessed other girls doing from her own experience. That is, L4 drew on relevant memories to try to make sense of female coyness in her attempts to understand Darwinian sexual selection and courtly love.

² L6’s observation could lend itself to a contrastive discussion between the SSSM and EP model of the mind and human nature (see Orians, 2010). The discussion would involve the existence of evolved modules of behaviour regarding mate selection and choice (Orians, 2010).

Plotting L4's beliefs about courtly love on the ACC.

L4 continues to draw on *Remember* in a warm and open context. There is maximum potential for her move toward a decision or a firm position notably her negative view of current dating practices aligns not only with Darwinian notions of coyness but also that of her romantic and nostalgic vision of courtly love. In other words it is only a matter of time before she makes the connections between them.

On Figure 5.1 I have plotted Extract 12 at the crest of the back loop in the α -phase.

Extract 13

Context.

Extract 13 follows on from Extract 12. In response to L4's comment that there were "so many" girls "obsessed" with unattractive boys (Extract 12, Lines 105-111), L5 began a discussion based on research about which she had heard that showed marriages where the woman was more attractive than the man tended to "work out".

What does the extract show?

L5 said, "There have been studies showing that if the female is less attractive than the male, then the relationship is less likely to work out" (Lines 113-114). L4 questioned whether it should be if the male is less attractive than the female then the relationship was less likely to work out (Line 116). In Line 122, L4 said that, "Brad and Ange seemed to be working out though." Presumably L4 thought Angelina Jolie was more attractive than Brad Pitt. L5 became confused, repeating three times that she had reversed the order (Lines 124-127). L4 clarified L5's confusion in Line 128, asking whether it was the male that had "to be better looking than the female?" to jeopardise the relationship. L6 recognised L5's confusion (Line 130) although L4 supported L5's interpretation of her confusion (Line 133).

L5 offered a reason for attractive women preferring unattractive men. She said, "It makes the female feel better about themselves" (Line 134) and "if the male is like worse looking, they kind of feel more good looking they feel they can always do better" (Lines 142-143). L4 responded saying "I suppose that's for the shallow people" (Line 150). L5 replied that the way that couples behaved was "not necessarily a conscious thing" (Line 153-156). In L4's subsequent reply she cited the example of Michael Douglas and Catherine Zeta Jones as an

example of a married couple comprised of an unattractive older man and an attractive woman who had a successful relationship (Lines 157-162). L4 introduced the example of Douglas and Jones couple and L6 interrupted with an expression of disgust saying: “oo so gross” (Lines 159 &161). L4 completed her comment saying that they were nevertheless happy as a couple: “but she loves him and they’re working out” (Line 162). Note that L4 said this with a vocal fry and followed by voiced laughter.

Discussion of what it might mean.

It is possible that L5 was probably referring to McNulty, Neff and Karney (2008) who looked at the role of physical attractiveness in shaping marriages. The authors found that attractive husbands were less satisfied. Both spouses behaved more positively where the wives were more attractive than their husbands. The couples behaved more negatively when husbands were more attractive than their wives.

L4 questioned L5’s telling of the research findings, but then L4 began to agree with L5 after further explanation. L4 connected with L5 by citing the example of Michael Douglas and Catherine Zeta Jones. This example seemed to support L5’s rendition of the McNulty et al., (2008) research findings. L6 and L5 expressed disgust and mockery when they spoke of the age difference between Douglas and Jones. L4 however, appeared to act as a moral compass reminding her classmates that in spite of physical appearances the couple was loving and functioning. This was in direct contrast to her previous view of disgust at seeing many girls obsessed with unattractive boys (Extract 12 Lines 105-111). In this instance it appears that L4 experienced a cycle of collapse-reorganisation-growth in respect to her ideas about relative attractiveness of couples and the success of their relationships.

Plotting L4’s beliefs about courtly love on the ACC.

Up to this point in Lesson 1 L4’s peers and her teacher have contradicted L4’s views about courtly love and contemporary courtship with supported arguments. L4 was probably much less certain of her original view of courtly love expressed in Extract 1. L4 could be in a position of indecision, but poised to take a new direction. For these reasons in Figure 5.1, I have plotted Extract 13 at the crest of the back loop but closer to the point of collapse than Extract 12.

Note that Extract 13 includes the infinite symbol indicating that L4 passed through a mini-ACC as discussed above.

Extract 14

Context.

After extract 13 the students cited the names of other celebrity couples. The students appeared to have exhausted the discussion on attractiveness. L5 began to repeat information about the study she had read. L7 asked what they should write. In this extract L4 led the composition of the group's answer which they did collectively in English.

What does the extract show?

L4 announced loudly that she would say there are “links” (Line 166). L5 and L6 stated their agreement (Lines 168-169). L5 began with “according to the article” with L4 overlapping “article” with “author” (Lines 172-173) and going on to say that “in the courtly love the woman wears the pants” (Lines 178-180). L4 expressed her doubt about the links between courtly love and sexual selection because they are “theories” (Lines 199-201). L4 read her text out first (Lines 209-212) stating her agreement with the text but adding in Lines 211-212 the caveat that she was “inclined to agree but whether the theory is true is another issue.” L5 then read her answer (Lines 213-215).

Initially the two students differed in so far as L4 preferred to remain sceptical given that she considered these links “theories” (Lines 199-201), and because the information in the text was all she had to go on. However, L5 came to agree with L4 and added her caveat that she agreed based on the information they were given (Lines 222-227).

Discussion of what it might mean.

L4 appeared to exhaust the positive contributions from the sources of ‘remember. L4 developed a clear understanding of the links that were in accordance with L5. However, L4 decided to remain sceptical. In part, this scepticism was taken up by L5. In summary, L4 tended to agree that courtly love was possibly an expression of female coyness which was consistent with Darwinian sexual selection. It was possible that the notion of the biological origins of courtly love may have taken root with L4 and is making connections with other

areas for L4. These connections give the idea stability and a sense of legitimacy and defensibility.

Plotting L4's beliefs about courtly love on the ACC.

I have plotted Extract 14 at a midway point in the back loop in the growth or r-phase (Figure 5.1). L4's direction appeared still uncertain at this point but she had the potential to take a course the given added connections from her discussions with her classmates.

In summary the transition between 'K' through 'Ω' to 'α' and entry into 'r' occurred between the end of Extract 8 at around 32m38 and the end of Extract 14 at about 38m52; that is, the transition took around 06m14.

L4 was obliged to revise her view and accommodate new ideas given textual arguments and discussion with peers, but remained sceptical. The idea took root but could easily be uprooted given her openness to new evidence.

Section 4: Summary of Extracts 1-14 Lesson 1 – Conservation (K₁), Collapse (Ω), Re-organisation (α) and Renewal (r)

In the preceding section I described and discussed L4's responses to the topic of an evolutionary psychological interpretation of French medieval courtly love. This included a discussion of the historical origins of courtly love as an expression of the premodern world view. Lesson 1 the Section 1 I presented Extracts 1-8 which constituted the Conservation (K₁) or pre-disturbance phase where L4 presents her understanding of courtly love that is her own story. She listened to other students and heard the expert story. In Section 2 I argued that the collapse phase occurred in Extract 9 during the small group discussion and critique of the expert story and texts in the Unit of Work for Lesson 1. In Section 3, I reasoned that the reorganisation phase is covered by Extracts 10-14, where L4's apparent confusion and prejudice with regard to theories of evolution are cleared up and she comes to a decision to remain sceptical about the Darwinian interpretation of courtly love. Extract 13 stands out from the others in this phase owing to a micro-ACC where L4 appeared to experience a collapse and renewal event within the overall discussion. This is represented by an infinite sign in Figure 5.1

There is no other mention of courtly love in class until Lesson 6, which was over a month after Lesson 1. What follows is the process L4 appeared to go through in choosing to focus as her topic the premodern world view of nature and God (with courtly love as an expression of that world view) and the relationship between the premodern, modern and the postmodern ecological world views in respect to an the promotion of an ecological restoration project of a local island.

In Section 5, I propose that the renewal/growth (r) phase begins at Extract 15 and continues to Extract 18. During this phase L4 decides on her task and develops her original song. In Section 6, I suggest that in Extract 19 L4 reaches the second renewed conservation phase in (K₂) in the development of her song. In Section 7 I record what appears to be a period of crystallisation through defence of her work in Lesson 9, editing, and rehearsals. L4's earnestness and her frequent singing of the song in class could suggest a private epiphany that she wished to communicate to her classmates, teacher, and researcher. After Lesson 12 (Extract 25), L4 undermines her apparent epiphany reporting she did not experience anything new in the Unit of Work. This could be interpreted as senescence of her idea. Finally in Section 8, I summarise the main findings of this metaphorical representation of the development of L4's song as ecosystem change.

Section 5: Renewal/Growth (r) – The Creation of an Original Idea: Extracts 15-18

The following extracts come from subsequent lessons that related to L4's learning experiences in Lesson 1.

Extract 15 – Lesson 6

Context.

In the last 10 minutes of Lesson 6, 35 days after Lesson 1, L4, followed by her learning partner L1 decided to attempt to connect courtly love to the medieval premodern world view, and from there to the ecological postmodern world view and the environmental movement. Lesson 6 was conducted mostly by me as participant–researcher. In this lesson I explained to the students in French and English the underlying connections between the themes in the lessons.

What does the extract show?

L1 and L4 decided to work on courtly love (Lines 490-504). L4 then suggested that they consider the medieval world view of the environment “otherwise courtly love won't really make sense” (Lines 505-507). L4 then proposed to talk about how contemporary French people consider the environment after which they would talk about God (Lines 509-510). From Lines 513-515, L4 attempted to justify her choice to focus on courtly love because she thought that I had told her that it was central. L1 and L5 corrected her saying that everything is about the environment (Lines 516-520).

Discussion of what it might mean.

L4 appeared to be in a phase of ongoing selection of paths to follow to achieve her goal of communicating her understanding of courtly love, the medieval world view, the environment and God. She had chosen a goal but was uncertain about how the pieces fitted together or what the final product would look like.

Plotting L4's beliefs about courtly love on the ACC.

Extract 15 shows that L4's ideas were low in connectivity, relatively low in their potential for change because she had decided globally what to do, and relatively high in resilience given the momentum provided by the decision to move in the chosen direction. On Figure 5.1 I plotted extract 15 on the upward slow of the growth or r-phase.

Extract 16 – Lesson 7

Context.

Lesson 7 occurred two days after Lesson 6. It was a free lesson in which students prepared their podcasts in pairs. It was Friday morning and the lesson began with croissants and hot chocolate. My observation notes record that the class was animated with jokes about confusion over courtly love with female vocalist Courtney Love. This extract occurred about half way into the lesson. L1 and L4 were discussing the life of Justin Bieber as a child star. L1 interrupted L4 and brought L4 back to their task.

What does the extract show?

L1 redirected the conversation to the task at hand (Line 1). L4 paraphrased in English the proposition that courtly love was derived from observations of nature (Lines 3-4). L1 said that L4's statement would "follow on" from hers, which she proceeded to read out in French (though only the English is repeated here): "For persons of the middle ages during the premodern world view the environment was very important in the way in which they saw everything" (Lines 8-13). From Lines 15-24 L4 began to translate the phrase "*ils ont vu tout*" (they saw everything), beginning with "they" followed by a pause of 0.3 seconds, and L1 completed the translation (Line 17). In Line 26, L4 stated the French translation of the proposition in Lines 3-4.

Discussion of what it might mean.

In this extract the germ of the essence of L4's song appeared. In L4's song she stated that animals showed the way to love. In this extract L1 revealed her interpretation of the premodern world view that saw the importance of Nature, to which L1 added that courtly love was derived from observations of Nature.

Plotting L4's beliefs about courtly love on the ACC.

I believe that the essence of L4's key message in her song has crystallised and will be added to and defended from here on. For these reasons I have plotted Extract 16 above Extract 15 heading upwards in the direction of Conservation K (Figure 5.1)

Extract 17 – Lesson 8

For Lesson 8, three extracts are presented, together with more detailed description of L4's song as the main learning outcome.

Context.

This extract comes at the very beginning of Lesson 8. Lesson 8 was a free lesson in which students worked on their podcasts. The teacher reminded students that their podcasts needed to be ready by the coming Friday and encouraged them to make progress and to be well rehearsed. The extract begins with L4 announcing to L1 that she wanted to teach her the song she had written, the song that explains their understanding of courtly love and links that to environmental issues, using as an example Whakaraupō (the Maori name for Lyttelton Harbour, where Quail Island is situated).

What does the extract show?

L4 announced that she would teach L1 her song (Line 2). She sang in French loudly with no recognisable melody (Lines 6-8). L1 interjected in latched speech (see Table 4.1) during the song and may have asked in French what was wrong with her (Line 9-10). L4 continued singing at a faster rate (Lines 11-12). L1 added an unvoiced laugh that developed into brief voiced laughter in the available pause (Line 13). L4 continued but quieter (Line 15) and L1 said "OK" (Line 16) loudly overlapping L4's verse. L4 continued (Lines 17-20). L1 said "ok" at the end and L4 asked her how to spell the French word for beauty (Line 23). L1 spelt out the word in English (Line 25). L4 thanked her and then completed her verse (Lines 26-27). After a pause of 2 seconds L4 asked L1 what she was doing. L1 said she was transcribing L4's song. L4 said that her song was not finished and that she might alter it. L1 replied she would just write down the beginning of the song.

Discussion of what it might mean.

L4 introduced the song as a new idea and L1 played the role as a source of behaviour and language feedback as well as scribe. L1 appeared to attempt to temper L4's exuberance and quieten her. L1 helped L4 with her spelling and began to transcribe her song even though L4 said it was incomplete and subject to change.

L4 sang that she had no idea what made Nature (Lines 6). In Lines 6 and 11 she sang that even though she did not know what made Nature she knew that it was alive. She then says that the environment sings with passion as well as the trees in the breeze, and that Quail Island was the place where the Maori appreciated beauty. Finally she sang that the animals proved their worth. There is no evidence that L1 commented on or questioned the contents of the L4's song, neither in this extract nor at other any other time during the lessons.

L4's song was new, incomplete, and subject to change. L1 accepted the song without question. L4 questioned her for doing so; that is for being uncritical. L1 said she would only transcribe the beginning of the song. The potential for change was possible but doubtful given L1's acceptance of it. Resilience was consequently relatively high and connectivity was increasing. L4 appeared to connect various themes covered in Lessons 1 and 5 of the Unit of Work. L4 referred to Quail Island and its significance to Maori as discussed in Lesson 5. The first line of the song appears to refer to L4's possible uncertainty about the origin of Nature; this may hark back to the debate in Lesson 1 about Darwinian theories of evolution. L4 appears to have been turning toward the aesthetic and the spiritual when the intellectual failed to provide satisfying answers for her questions of ontology. That is, she was uncertain about the origins of Nature but she knew that Nature was alive. For L4, this aliveness was evidenced through the way in which Nature was able to communicate aesthetically through song and (as is revealed later in Lesson 8) to convey through animals moral messages about love to humans.

Plotting L4's beliefs about courtly love on the ACC.

The song appears to have high connectivity where L4 was emotionally and intellectually engaged with it. L4's expression of emotional and spiritual commitment to the contents of the song may lower its resilience to change pushing idea complex further to the right. The song was still somewhat tentative given L4's intellectual uncertainty about the origins of Nature

and its incompleteness. In this way, the potential for change was relatively high. For these reasons I have plotted Extract 17 above Extract 16 rising up through the Growth or r-phase (Figure 5.1).

Extract 18 – Lesson 8

Context.

This extract follows on from the end of Extract 17. The extract is broken down into three short sections that occurred between minutes 3 and 6 of the recording. The extracts show the formation of L4's next verse in her song. The completed verse (in translation) was: "The animals proved their worth because they showed the way to love". The construction of L4's verse was lengthy owing to interruptions from the class and L1.

Over the course of the construction of L4's verse, L1 interrupted her three times with off-task talk: L1 discussed borrowing a pen, L1 said she was worried about having insufficient internal NCEA credits, and L1 said she had to change her orthodontist appointment. I have included extracts where L4 introduces her idea and negotiates confirmation from L1.

What do the extracts show?

In the first section (a) of Extract 18, L4 said in French that Quail Island had proved its value because it showed—and then she was cut off by L1, who interjected quietly saying that she was worried about her NCEA credits (Lines 1a-4a). L4 paused and then proceeded to tell L1 the number of credits she had (Lines 5a-9a).

In Extract 18 (b), L4 said in English, "the animals of the thing proved their worth because they showed" (Line 1b). It is likely that "the thing" referred to Quail Island or *L'île aux Cailles* which she mentioned in Line 1a above. L1 continued to talk about her credits (Line 3) and appeared to have filled L4's lacunae (Line 2b). In Line 5b, L4 added to the statement, switching from English to French, saying "showed *la façon*"; she then interrupted herself to rejoin L1 in her ongoing conversation about L1's credits (Lines 7b-18b).

In Extract 18 (c) L4 completed her sentence with the assistance from L1. L4 began by asking whether the clause "*parce qu'ils ont montré la façon dont*" (because they showed the way in which) made sense (Line 1c). L4 then translated *la façon dont* as "the way of which" (Line 2c). L1 in overlapping speech corrected L4 replacing "of which" with "in which" (Lines 3c &

5c). L4 then completed her phrase with clause “we love”. L4 then asked L1 how to say “to love” in French. L4 said it was “adorer” and L1 agreed (Lines 11c-15c).

Discussion of what it might mean.

These extracts show that L4 relied on L1 for the French translation of her idea. In exchange L4 listened to L1’s concerns about her internal NCEA credits. L1 appeared reliant on L4 for the creation of the idea; in Extract 17 she was willing to transcribe it even though L4 said it was tentative and incomplete. In this extract L4 did not question L1’s translation, in the same way L1 did not question L4’s ideas.

L4 saw the value of animals as moral examples for human loving and this gave them value. L4’s utilitarian valuation of animals (Callicott, 1997) overlaps with the medieval view where the role of animals was to meet the needs of humanity, including the provision of moral lessons (Yamamoto, 2000). In Chapter 6 I discuss further the issues raised by L4’s conservation ethic as expressed in her song.

Plotting L4’s beliefs about courtly love on the ACC.

L4 built her verse with the tacit support of L1, making her idea increasingly supported by, and connected to, her classmate. Further, L4 justified the value of animals based on the premise that they were moral exemplars for how to conduct oneself in romantic love; in this way, L4 connected ideas about conservation of biodiversity to notions of sexual morality. L4’s message was further strengthened and made increasingly rigid having been translated into French. This means to undo or to question L4’s conservation ethic would require a rethinking in English then a reworking in French. It would not be surprising if the students would be reluctant to do this given the extra work it would entail. Increasing rigidity heightens the potential for collapse and lowers the resilience of the idea. For these reasons I have plotted Extract 18 above Extract 17 and approaching the Conservation K-phase (Figure 5.1).

Section 6: Arrival at Conservation (K2) - Idea Refinement

Extract 19 – Lesson 8

Context.

This extract follows directly on from Extract 18c above. L4 led the construction of her next and final verse in her song. The completed verse was:

« Donc rappelez-vous ce (sic) et n'oubliez jamais comment vous vous sentez quand vous savez que la nature est vivante »

"So remember this and never forget how you felt when you knew that Nature is alive."

What does the extract show?

The bulk of Extract 19 shows L4 and L1 arguing about how to translate “so remember this” into French (Lines 17-85). The dispute was resolved when L4 asked the teacher (Lines 66-80). Lines 86-91 involved translating the phrase “and never forget”. In Lines 98-99, L4 added in French, the phrase “*comment vous sentez quand vous savez que la nature est vivante*” (“how you felt when you knew that nature is alive”). L4 introduced this phrase without discussion or approval from L1. L4 translated the phrase into English stressing the clauses “how you felt” and “when you knew” (Line 102).

Discussion of what it might mean.

It appears that L4 came to the lesson with her song largely worked out. The time spent up to this point in Lesson 8 was used for the translation of two phrases “so remember this” and “never forget”. The completed verse became:

« Donc rappelez-vous ce (sic) et n'oubliez jamais comment vous vous sentez quand vous savez que la nature est vivante »

“So remember this and never forget how you felt when you knew that Nature is alive.”

There is no evidence from the data set that L4 explained what she meant by the song and notably by the refrain “*la nature est vivante*”, nor did her classmates or teacher ask for an

interpretation. When challenged in Lesson 9 she claimed the song was the most important aspect of her contribution (Extract 23); thus, interpretation of her song is left up to us.

L4's song has a biblical ring to it. The clause "remember this and never forget" overlaps with a Deuteronomy 9:7 from the New International Version (NIV) of the Old Testament: "Remember this and never forget how you aroused the anger of the Lord your God in the wilderness".

Further in Extract 17 (Line 12) L4 sang: « *l'environnement chante avec passionne et les arbres aussi dans la brise* » (the environment sings with passion and the trees also in the breeze), which is reminiscent of Isaiah 55:12 NIV: "the mountains and hills will burst into song before you, and all the trees of the field will clap their hands", and which is also reminiscent of Psalm 96:11-12 NIV: "Let the fields be jubilant, and everything in them; let all the trees of the forest sing for joy".

The dominant element in L4's song is the refrain "Nature is alive". Given the biblical overlap with the aforementioned verses it would not be too farfetched to consider her use of Nature may have been both a reminder of the resurrected Christ, as well as an expression of a metaphorical resurrection of Nature; that is, Nature was once lifeless and without value but was now alive and valuable.

It appears from L4's reasoning nature is alive because the environment communicates to humans through song and that animals demonstrate to humans how to love. For L4, animals "prove their worth" because they communicate moral lessons to humans.

L4's use of the second person pronoun "you" which she translated as "*vous*" is ambiguous. "You" could refer to herself as the second person singular pronoun, to the audience as the second person plural, to the general "you" such as equivalent to the third person pronoun "one". A further ambiguity is that in French *vous* may refer to the polite form of the second person singular. However, the stress she put on "you" in her translation (Line 102) suggests a reminder to her, but also an attempt to remind others (both generally and personally). In her song L4 stressed that she/one/we should remember and never forget the moment when she/one/we realised that nature was alive in this sense. L4's earnestness along with her vociferous and lively attempts to communicate her message may suggest that she underwent a kind of epiphany or dramatic insight that she wished to communicate to others.

Prior to this moment it is arguable that she may have considered animals of little value and Nature somewhat lifeless. From her song she stated that she was in communication with the environment through its passionate singing, and through the moral guidance for love from animals. In other words, L4 said through her song she felt connected to Nature. It can be inferred from her song that this feeling of connection occurred in a single moment. In sum, L4 appears to be telling us that she underwent a transcendent experience where she became all at once connected to Nature.

However, this apparent dramatic shift in values did not show up in her exit questionnaire, which is presented in Table 5.1. This table provides the self-reported pre-unit and post-unit questionnaire responses of Students L1 – L7 to the question of how they saw themselves in relation to nature.

Table 5.1 *Pre-unit and Post-unit Work Questionnaire*

Question:

How do you see yourself in relation to Nature?

A part of Nature – Separate from Nature – Somewhere in between

Question Purpose: Sense of place in Nature – to see whether the unit changed student view of themselves in relation to Nature. The question relates to belongingness and authenticity. Contact with the authentic tends to engender belonging. The 100% Pure NZ advertising campaign could have engendered alienation from New Zealand

<u>Student</u>	<u>Before</u>	<u>After</u>
L1	Somewhere in between	No Response
L2	Somewhere in between	Somewhere in between
L3	No Response	No Response
L4	A part of Nature “I’m one with nature”	Somewhere in between
L5	Somewhere in between	Somewhere in between
L6	Somewhere in between	No Response
L7	Somewhere in between	Somewhere in between

As Table 5.1 shows, L4 is the only student to have reported a change in her perception of herself in relation to nature, and this appears to be a loss of oneness. At the beginning of the

unit she stated that she considered herself “part of Nature” and she explained that she felt “one with Nature”, but at the end of the unit she stated that she felt “somewhere in between society and Nature”. This discrepancy between what she reported and what she communicated in her song could reflect her understanding of the ecological postmodern world view that I taught in Lesson 6, where humanity sees itself as both a part of and also separate from Nature (Davis, et al., 2000). Further, it is conceivable that L4’s statement in the pre-unit questionnaire that she was “one with Nature” was flippant.

The second insight from this extract and also from the preceding Extracts 17 and 18 is that they reveal the painstaking word by word manner in which L1 and L4 translated L4’s English ideas into French. This method was typical of the other members of the class. This laborious translation may indicate an onus on grammatical precision rather than communication, or it may indicate that L4 had not yet attained a level of automatization with French.

Automatization is for some researchers, such as Wood (2000) an indicator of fluency. The learner who has attained automatization can access language knowledge unconsciously and effortlessly in a process referred to as automatic processing (McLaughlin, Rossman & Mcleod, 1983; Wood, 2008). The converse is controlled processing and is the conscious and demanding process of choosing, arranging, and applying language rules to create an original utterance (see McLaughlin et al., 1983; Wood, 2010). These are ideas which I discuss further in Chapter 7.

Plotting L4’s beliefs about courtly love on the ACC

L4 demonstrated an emotional engagement with these ideas and a strong and vociferous desire to share them with others; in other words her idea appears to have reached *reproductive age*. Further, in the final verses of her song L4 urged the listener to remember and never forget the communicability of the environment and the moral lessons of animals. In this sense L4 wanted her idea to remain in the minds of others but for it to be also emotionally charged. It thus appears that L4 believed that her idea should play a central and connected role in the minds and lives of others. It is possible that her idea played this role in her mind and was thus highly connected to other aspects of her life.

The high connectivity of an idea lowers its resilience to shock and disturbance. In this way the potential for dramatic change is increased. Because of the increasing inflexibility of L4’s

idea, but allowing for her admission that her idea was still incomplete, I have placed Extract 19 sitting above the cusp of the Growth r-phase and the Conservation K-phase (Figure 5.1).

The next section shows L4's movement back to the conservation quadrant of the ACC.

Section 7: Conservation (K₂) - Idea Calcification and Senescence - Extracts 20-25

Extract 20 – Lesson 8

Context.

This extract is also from Lesson 8 and follows on from Extract 19.

What does the extract show?

After an 8 second silence that followed the cries outside the classroom of red-billed gulls, L4 whispered to L1 that she did not understand the connection between the ecological restoration project of Quail Island and courtly love, and the environment and courtly love (Lines 1-4). L1 then suggested they draw a mind map. L4 proposed that instead they should just talk through the eras when “we really cared about the environment”, and “the period where we didn’t”, and include that “we’re back in the era where we’re tryin’ to conserve everything” (Lines 5-13). At Line 11, L1 interjected saying that they should keep it simple. L4 suggested that they simply avoid talking about courtly love, and L1 agreed (Lines 14-15). L1 argued that they could not talk about every environmental period because that would mean covering the entire unit (Line 16). At this point L4 proposed that they “just talk about the old view” (Line 18). L1 agreed but added that they talk about the “old view” in relation to “Nature”, “God”, and “today”.

Discussion of what it might mean.

In this extract the students appeared to be deciding what to include in their podcast speech beyond the song. L4 admitted that she could not see the link between courtly love and the environmental movement. The connection between the environmental movement and medieval courtly love that I had hoped the students would make was that the two sets of ideas emanate from a comparable ecological world view that saw an integration of society, Nature,

and religious belief. Indeed, L4 had expressed this connection somewhat unknowingly in her song with regard to how the God communicates with humanity through Nature (Extract 19).

Plotting L4's beliefs about courtly love on the ACC.

L4's rejection of courtly love, but then her inclusion of it somewhat unknowingly in her song, suggests that she had personalised the ideas so much so that she could not see that they were connected to the texts and discussions in Lesson 1. This may mean that her conceptualisation of Nature in communication with humanity was original. This notion of novelty may have been part of the impetus for her enthusiasm for her song.

If this reasoning is correct then her idea would be further supported as she connected to it emotionally. In this way, her idea becomes crystallised, increasingly rigid, and thus increasingly susceptible to collapse with a growing amount of connections, and decreasing resilience. For these reasons I have plotted Extract 20 in the conservation quadrant above Extract 19 (Figure 5.1).

Extract 21 – Lesson 8

Context.

This extract occurs in Lesson 8 approximately 7 minutes after Extract 20. During that time L4 asked L5 if she had watched a particular DVD. The teacher announced she would test vocabulary the following day. L4 started to talk about the sexism displayed by a representative of the Employment Association who claimed women cannot do medicine. Doctors should become doctors for caring, not just a brain exercise, or for ego. Other groups discussed reforestation and L4 contributed. Students consulted the other groups about starting sentences with “*donc*”, the spelling of “*rappeler*” (to remind).

What does the extract show?

Together L1 and L4 chose *The Saints Go Marching In* as the melody for the lyrics of the song L4 had written. L4 sang the entire song loudly; L1 attempted to interrupt her saying that she could sing it to the Marseillaise.

The teacher interjected saying that their podcasts would be posted on a well-read French website and they would receive feedback from the honorary French consul. Extract 21 shows the lead up from L4's selection of the melody to L1's interruption.

Discussion of what it might mean.

L4 rejected French melodies that she did not know well and connected her song to one she considered simple. The choice was appropriate and she sang the entire song largely without hesitation supported by the laughter from L1 and other students.

Plotting L4's beliefs about courtly love on the ACC.

L4's idea increased in connectivity and for this reason I have plotted Extract 21 further to the right than Extract 20 (Figure 5.1)

Extract 22- Lesson 8

Context.

This extract is also taken from Lesson 8. It follows on from L1 and L4 discussing the teacher's fortieth birthday and whether a student who was suffering from anorexia would be invited. At this point L4 cited the THINK acronym regarding gossip (Before you talk to someone about someone else THINK! is it true, is it helpful, is it inspiring, is it necessary, is it kind). It is possible that L4 was reading this from a poster in the classroom.

What does the extract show?

L4 revealed that she understood the premodern medieval view that the study of Nature "helped them come to know God better" (Lines 1-3) and appears to be drawing on her reading from Lesson 1, but L4 did not see the hypothetical connection to courtly love. In Lines 5-6 she said "and they found out the idea of like courtly love and they just sort of really (1.6) liked the idea of everything (1.6) that was going down", following which she drifted into her refrain of the song (Line 7).

Discussion of what it might mean.

Extract 22 expresses L4's interest in the medieval world view included the role that God in the Nature. The apparent evolutionary challenge to L4's faith in Lesson 1 appears to have manifested itself in a rethinking and reinforcement of that faith.

Plotting L4's beliefs about courtly love on the ACC.

L4's idea was expressed overtly and earnestly as connected to God thus further crystallising it. The added connection lowers the resilience and increases the potential for change. I have therefore plotted Extract 21 inside the Conservation K-phase quadrant (Figure 5.1).

Extract 23 – Lesson 9

Context.

Before the start of the lesson the teacher told the researcher that she did not consider the evolutionary psychological explanation for skill displays as argued by Dutton (2010) was relevant or credible. She argued that students performed because they wanted to “feel good about themselves” not as a courtship display.

What does the extract show?

L1 explained to the teacher that they could not see a link between Quail island courtly love (Lines 75-77). L1 cited the handwritten text from Dr. Vivienne Burrows that said there was no connection (Lines 79-82). The teacher agreed (Line 83). L1 said they had decided to cover the premodern world view with the contemporary world view. L4 described premodern view as where “like they just really viewed Nature as a part of them” (Lines 90-91). L1 added that “and how we're (tryin') coming back towards that” (Line 92). L4 began to talk about the song. She said that “he doesn't see the point” (Line 97-98). L4 said the song was about “appreciating Nature and stuff” (Lines 99-100). This was followed by nervous laughter (Line 100). She went on to say that she thought the song would “add to it” if they did the “song about nature” and “restoration of nature” and “them seeing nature” (Lines 101-103). The teacher agreed quietly (Line 105). L1 said that L4 was trying to justify something (Line 106).

Discussion of what it might mean.

L1 and L4 rejected making a connection with courtly love and Quail Island. L4 referred to a hand written text by Dr. Vivienne Burrows, wife of Dr. Colin Burrows science advisor of the Quail Island Ecological Restoration Trust (QIERT) (see Appendix 6). The text explained that there was no connection between ecological restoration of Quail Island and courtly love. Dr. Vivienne Burrows saw courtly love as part of the leisure of noble elite; courtly love not unlike elaborate hunting parties was a stylized and artistic representation of Paleolithic courtship rituals and hunting:

Courtly Love spread widely in Eastern Europe but is a stylised expression of human behaviour, an artistic imitation of old realities. It was as if they were watching themselves in a mirror as they hunted and sang and strummed and danced and lived as an art form, playing idealised courtships in their endless leisure – unless there was a war nearby. (Burrows, V. 2011 p. 1, see Appendix 6)

Further, she argued that courtly love was a diversion from the burden of arranged marriage thereby offering the possibility of experiencing romantic love that was denied to them through medieval marriage alliances.

Remember also that for the rich and powerful young people did not choose their mate so there was no guarantee of love or happiness. Think what a help and delight the Art of Courtly Love brought to these societies, and what opportunities it offered for something more without overt risk! (p. 2)

She concluded that, “the Quail Island project is not like Courtly Love, but offers a marvellous chance for cooperative work (with visible results) so it is both rewarding and a basis for genuine friendship and communication” (p. 2).

L1 and L4 decided to focus on the overlap between the premodern world view and what appears to be the ecological postmodern. In the former view humanity saw itself as part of Nature and in the latter view humanity argues through Gaia consciousness, for example, for an ecological world view that integrated nature and society.

In L4's justification she argued that the song was about appreciating Nature. It is likely that L4 was referring back to Lesson 6. In this lesson I explained to the class in English the motivation of the experts on Quail Island for their efforts to restore the island.

The experts prepared this information for the students at a meeting held at Colin Burrows' house to make up for the cancelled field trip to the island because of the June 2011 earthquake (see unit plan Appendix 1). Unfortunately, the either cancelled or did not present themselves on the day; this included L4 and L5. The panel of experts included: Lincoln University entomologist Mike Bowie; Professor Ross Cullen, specialist in biodiversity and resource conservation; Dr. Colin Burrows, botanist and formerly lecturer at the University of Canterbury; and Dr. Vivienne Burrows, specialist in comparative animal behaviourism, also a former lecturer at the University of Canterbury. The motivation of these experts was, by and large, a love for the island and its biota, a passion for the work of saving biodiversity, and a desire to redress the near total destruction of the Bank Peninsula forests. Vivienne Burrows spoke of her husband's delight in the work. Ross Cullen also spoke of the gratification he received from working outdoors.

In Lesson 6, I summarised for the participants the motivation of the experts as an appreciation of both the beauty of Nature, a concomitant desire to restore and protect it, along with the simple pleasure of being outdoors. I mentioned also the strong role the aesthetic plays in motivating the public and policy makers to support conservation projects³. In this way, I was alluding to Scarry's (1999) premise that because of the lifesaving effect of beauty, it calls us to protective action of the beautiful object (see Dutton, 2000 for a critique of Scarry's hypothesis). Furthermore, the motivating forces of love, aesthetics, and wonderment and so on are key to understanding the connection between the sciences and the arts as well as being a central motivating force for many scientists (see Engler, 1990; Chandrasekhar, 1987; Dawkins, 1998; Wilson, 1998; Scarry, 1999).

Plotting L4's beliefs about courtly love on the ACC.

For L4 the song reflected a key message in the Unit of Work. L4 defended the use of her song emotionally possibly reflecting the crystallisation and rigidity of her idea. The fact that I

³ Utilitarian arguments for conservation include the aesthetic ones. Note that the majority of conservation scientists who tend to reject such arguments (Rudd, 2011). Animal physical attractiveness has a greater positive impact on conservation policy than scientific reasoning (Metrick & Weitzman 1996; Gunnthorsdottir, 2001; Knegtering, Hendrickx, van der Windt & Uiterkamp, 2002; Stokes, 2006; Marešová & Frynta, 2007; Estren, 2012; Lišková & Frynta, 2013). Stokes (2006) warns that human preferences for certain animal species will determine their survival.

grappled with her meaning of L4's refrain "La Nature est vivante" shows to me that she was conveying an original interpretation of the material in the Unit of Work that had become unrecognisable to me. I have placed Extract 23 in the conservation phase (K) depicting an ever falling resilience, increasing connectedness and potential for dramatic change (Figure 5.1).

Extract 24 – Lesson 11

Context.

This extract comes from Lesson 11, the second to last lesson in the course. At the beginning of the lesson L4 and her learning partner L1 sang their song in class. In the following passages I interpret the meaning of their song. I begin by recapitulating on its development.

In Lesson 6 the students L4 and her learning partner L1 chose the topic for their podcast as courtly love as it related to the premodern world view (Extract 15). At the beginning of Lesson 8, L4 announced to L1 that she had written a song for their podcast (Extract 17), which in Lesson 11 she called « *La nature est vivante !* » ("Nature is alive!") (Extract 24). L4 sang her song repeatedly in class. In Lesson 9, she defended the inclusion of her song in her podcast after she heard from the teacher say that I did not see the point in it (Extract 23). In fact, I found the refrain in the context of the Unit of Work difficult to understand.

What does the extract show?

In her song L4 said that she did not know what made Nature, but that she knew that Nature was alive (Line 1). She said that the environment and the trees sing with passion in the breeze (Line 11). She then sang of Quail Island as the centre of Whakaraupō and a place where Maori appreciated beauty (Lines 13-14). She said that the animals of Quail Island proved their worth because they showed the way to love (Lines 17-23). She concluded saying that we should remember this and never forget that Nature is alive. (Lines 25-31).

Discussion of what it might mean.

In Lesson 9, L4 defended her song. She said it was as an expression of the central meaning of her interpretation of the premodern medieval world view as a holistic communion between God, humans, and Nature. This overlapped with the view expressed in the student readings in Lesson 1. For L4, Nature was considered an expression of the spirit of God (Lesson 1). Under

this world view, humans could better understand God through the study of Nature. Furthermore, an appreciation of Nature and its beauty led to efforts to preserve the environment. This idea coincided with the talk I gave in Lesson 6 on the prosocial spin offs of the beautiful (see Appendix 1 Lesson 6).

However, most of L4's song does not appear to have been drawn directly from in the Unit of Work. The song in particular may be largely an original fusion of extrapolations from the limited information she was given, and her Christian world view. I have identified and summarised six such ideas below:

- a) In the context of her song and podcast, the refrain "Nature is alive", suggests Nature as an expression of the spirit of God as both conscious, and in communication with humanity.
- b) In an earlier draft of L4's song included the phrase, "remember this and never forget how you felt when you knew Nature is alive". In this way L4 appears to urge her listeners to recall the moment of epiphany when they realised Nature was consciously alive.
- c) L4 said that she does not know what made Nature but she knows Nature is alive. L4 side steps evolutionary arguments as expressed in Lesson 1, preferring to focus on the vitality and communion she has with Nature.
- d) Nature is anthropomorphically both passionately engaged in song and in providing moral lessons of love for people.
- e) Animals prove their worth because they are moral exemplars for love. By default, for L4, animals were either of low value or worthless before she realised their role as moral exemplars.

Extract 25 - Self- Reported Questionnaire Data – Post Unit Questionnaire

Further to the questionnaire data reported above, Question 7 asked:

What event(s), text(s), image(s), word(s), discussion(s), caused you to rethink your established ideas about New Zealand and France and their people, the world, your life, the study of French etc.,?

The purpose of the question was two-fold: to identify the experiences that induced a significant change in how the student considers something or someone, and to identify the source of an experience that would lead to Piagetian accommodation.

What does the extract show?

L4 answered: “None particularity (*sic*), as NZ has always tried to preserve the environment and felt connected to nature e.g. Maoris”

Discussion of what it might mean.

L4 stated that she experienced nothing particularly caused her to rethink established ideas. L4 did not acknowledge her apparent epiphany expressed in her song in this question nor in the free comments section of the questionnaire. Her explanation from the above response is that the preservation of Nature in New Zealand and the feeling of connectedness notably in regards to Maori to Nature were not new to her.

Possible explanations for L4’s apparent distancing herself from her epiphany could be explained in two ways. She never experienced any such epiphany and her vociferous and repetitive declarations of it though her songs were in a sense playing to the recorder and to the class as an audience; and she experienced what Scarry (1999) referred to as the awkward feeling of making a mistake about beauty.

Plotting L4’s beliefs about courtly love on the ACC.

L4’s idea appears to have become brittle and tired now and at risk of collapsing.

Summary

This chapter has presented detailed classroom transcript data, description, and analysis that trace the learning and classroom experiences of L4 and other students, through Lesson 1 and other lessons. The focus has been on the development of L4’s song that she wrote for the podcast task.

Extracts 1-14 were drawn from Lesson 1: The Mystery of Courtly Love. Based on the transcripts, L4’s conception of courtly love as emanating from the premodern holistic world view, where Nature is an expression of the mind of God and animals serve as moral exemplars for how to love, most likely originated from Lesson 1 and its readings (Appendix 1: Student readings). From the data set, L4 did not evaluate the ideas regarding courtly love after Lesson 1. L4 introduced her interpretations to L1 who did not dispute their content, but focused instead on translating them into French or verifying L4’s translations. According to

Bloom's (1956) taxonomy L1 engaged in *understanding* which belongs to the lowest order of thinking. L4 on the other hand demonstrated creativity and reorganisation through her song and thus her thinking was of the highest order in Bloom's taxonomy.

In the following passages I summarise the analysis of extracts 1-15 (see Figure 5.1).

Conservation (K₁) - Extracts 1-8

Extract 1: L4's own story.

L4 and her classmates told their own story about what they thought courtly love was. L4 revealed she had a nostalgic and positive view of courtly love as part of a charming romanticism that had been lost. She contrasted the slowness and intricacy of courtly love with "one night stands" and "texting". Whereas L5 and L6 gave their definitions of courtly love in French, L4 gave her detailed explanation in English. This generated confusion and tension. The transcript reveals from the outset that there is a discrepancy between the level of French fluency expected under the *NZC* proficiency Descriptor for communication in the learning Area of Learning Languages at Levels 7 and 8, and the evident difficulty students had in expressing themselves.

Extracts 2-6: teacher's expert story.

The teacher gave her interpretation of courtly love that included a dictionary definition (Extract 2). It is likely that L4 did not understand the explanations given in French. Students reviewed two medieval artworks as examples of the courtly theme: the tapestry *The Lady and the Unicorn* and the ivory jewellery box sculpture *The Siege of the Castle of Love*. Participation was in French and L4 did not participate significantly (Extract 3). The teacher said in French that courtly love shared a common process with animal courtship echoing the message in the student readings to follow later in the lesson (Extract 4). The teacher said in French she wanted the students to see courtly love her way (Extract 4). In English she gave a mocking rendition of the process of courtly love (Extract 5). The teacher said courtly love was "unusual". To illustrate this, the teacher spoke about the relationship between twelfth century philosopher Pierre Abelard and his student Heloise (Extract 6).

Extracts 7-8: expert story from student readings and the beginning of student critique.

L4 was put into a group to read collectively half of an article in French. The text proposed two hypothetical explanations of courtly love for student critique: given the medieval belief that animals could convey moral lessons, courtly love as a model for courtship could have been derived from an imitation of certain animal species and that the excessive adoration of the beloved could have been an expression of the guiding role of the female in Darwinian notions of sexual selection (Extract 7). L4 and her classmates answered comprehension questions based on the text. L4 disagreed with the Darwinian explanation without giving a reason (Extract 8).

Collapse (K→Ω.)

Extract 9 - student critique of the expert story.

L5, L6, and L7 realised that L4 had not understood the arguments in the text. It appeared that L4's disagreement was founded on a possible bias against the Darwinian argument. This may have caused a momentary loss of face for her.

Reorganisation (α)

Extracts 10-13.

L6 corrected L4's confused and inchoate understanding of the Darwinian explanation of courtly love (Extract 10). L4 gave a relatively coherent summary of the textual argument, having drawn of the feedback from her classmates. She would not, however, agree with them that larger biological investment of the female than the male in human reproduction could explain either courtly love or the tendency for the woman to have the decisive role in whether sexual relations take place (Extract 11). The discussion turned to contemporary practice where "girls always ask guys out" (Extract 12: L6, Line 102). L4 responded gesturing that to see girls infatuated with unattractive boys was sickening (Extract 12). L5 replied, quoting research she had read that showed marriages where the woman was more attractive than the man tended to be successful. L4 appeared to agree with L5, citing examples of celebrity couples where the man was less attractive than the woman (Extract 13). The students went on to cite more examples until L4 was ready to begin writing.

Arrival at Renewal/Growth (r) – Student Evaluation of the Expert Story

Extract 14.

L4 led the writing in English of the group response to their text, in this way selecting a direction to take. L4 agreed with the link between Darwinian sexual selection and courtly love, emphasising that it was the author's opinion and would be sceptical until she had more facts.

Renewal (r) – The Creation of an Original Idea

Extracts 15-18.

The next time courtly love was mentioned in was in Lesson 6, 35 days later. In this instance I explained to the class how the lessons in the unit of work were connected. L4 and L1 decided to focus on the connection between the premodern medieval world view and courtly love (Extract 15). In Lesson 7, L4 said humans learnt the idea of courtly love from observations of Nature (Line 4 Extract 16).

Extracts 17- 22 come from lesson 8.

At the beginning of Lesson 8, L4 introduced the first draft of her song exuberantly to L1, suggesting an epiphany. The song appeared to resolve her apparent issues with Darwinian evolution by side stepping the question of the origins of Nature, and focusing on a communion with the aliveness of Nature. L4's verse "the environment sings with passion and the trees also in the breeze" is reminiscent of two Old Testament texts (Extract 17).

In the same lesson L4 addressed the conservation of biodiversity in the next verse saying that "the animals proved their worth because they showed the way to love" (Extract 18).

L4's creativity and synthesis demonstrates high order thinking in terms of Bloom's taxonomy (1956).

Arrival at Conservation (K₂) - Idea Refinement

Extract 19.

L4 wrote the final draft verse of her song: "So remember this and never forget how you felt when you know (*sic*) that Nature is alive" (Lesson 8, Extract 19). The verse itself possibly

overlaps with Old Testament and New Testament notions. “Remember this and never forget” may have been drawn from Deuteronomy 9.7 (NIV). The remaining verse recalls contemporary Christian devotional music that recalls the Resurrection and a moment of conversion. Nevertheless, in spite of L4’s apparent epiphany she did not acknowledge it in her exit questionnaire.

Conservation (K₂) – Idea Calcification and Senescence

Extracts 20-25.

L4 appeared settled into the contents of her song and began to shed aspects of uncertainty. Even though L4 had made a connection between conservation and courtly love she said she did not see the link, and decided to drop the idea (Extracts 20 & 22, Lesson 8; Extract 23, Lesson 9). L4 decided to put the song to a “famous French song” (Line 1, Extract 21). After two trials she decided to and set the song to *The Saints Go Marching In* (Extract 21). In Lesson 9, L4 defended the use of her song. She said it was all about appreciating Nature (Lines 99-100 Extract 23). In Lesson 10, L4 and L1 sang the completed song to their classmates (Extract 24).

Finally, in her postunit questionnaire L4 said that there was nothing in the Unit of Work that led her to rethink any aspect of her life (Extract 25). This suggests that to her the song was now jaded and that she was in error to think that she was saying anything new. At this point her idea may have been ripe for collapse.

Conclusions

In this section I have described the development of L4’s conceptualisation of a biological interpretation of courtly love that I proposed in Lesson 1. At the outset L4 saw courtly love positively as romantic and charming in contrast to “one night stands” and “texting” (Conservation K₁). By the end of the course she said that “animals proved their worth because they showed the way to love” (Conservation K₂). During the passage between these two points she initially rejected the evolutionary and biological arguments for female coyness and mate preferences even though they appeared to support her view of courtly love. She had not understood the arguments and appeared to reject them without thinking them through (Collapse Ω). Through her classmates’ translations and paraphrasing she tentatively accepted

the arguments (Reorganisation α). In Lesson 6, L4 decided to focus on the connection between the premodern world view and courtly love (Renewal/Growth r). In her song she said she had no idea what made Nature but insisted on a vital communion with it. She said that animals prove their worth because they show the way to love. The song appeared to give an account of an epiphany. She polished and defended her experience and ideas (Conservation K_2). At the end of the course L4 declared that nothing in the Unit of work led her to rethink anything (poised for Collapse Ω_2).

There are three conclusions to be drawn from this account of L4's learning in this classroom context:

1. The account of L4's learning can be coherently plotted qualitatively onto an ACC template. This suggests that the pattern of L4's learning is analogous to that of ecosystem change.
2. L4 generated an original explanation for courtly love that was a consilience between Darwinian sexual selection, courtly love, premodern medieval world view, and her Christian beliefs. This synthesis could represent higher order thinking according to Bloom's (1956) taxonomy.
3. L4 was unable to discuss and debate ideas in French. There is no evidence that she learnt in the target language but instead relied on translation and paraphrase of the translation from her classmates.

In Chapter 6, I present the results for student L5 following the same method as for L4. For her French podcast L5 chose to treat the theme of the authenticity in the artistic and commercial representations of the New Zealand landscapes in relation to the current state of the environment, and in respect to the ideal landscapes and the savannah hypothesis. I include an investigation of possible communication between L5's learning cycle and that of her two classmates L3 and L7.

CHAPTER 6

RESULTS 2

« *ON N'EST PAS VERT* »

oh yes it can
be dark here
and Manuka
in bloom may
breed despair

Colin McCahon

For Varey (2011) the evolution of an idea in the mind of an individual learner, from the moment it is perceived to its acquisition or rejection, could in principle follow the ACC of Holling (2001). In the previous chapter I demonstrated that student L4's learning could be interpreted metaphorically as an ACC. In this chapter the data analysis and interpretation for student L5's learning are presented. The purpose of repeating the process is to demonstrate the extent to which the methodology can be replicated with another data set. Furthermore, in this investigation the communication between L5 and her classmates L3 and L7 is included. This is done to explore possible communication between ACCs in the classroom panarchy. In this instance I focus on the role of laughter as an indicator of learning, a connector between

phases (quadrants) of a single learner, and between one ACC and another in the form of panarchic revolt described by Gunderson et al. (2001).

In this chapter, thirteen extracts are identified as most pertaining to L5's idea development or learning. L5's learning is summarised graphically in Figure 6.1.

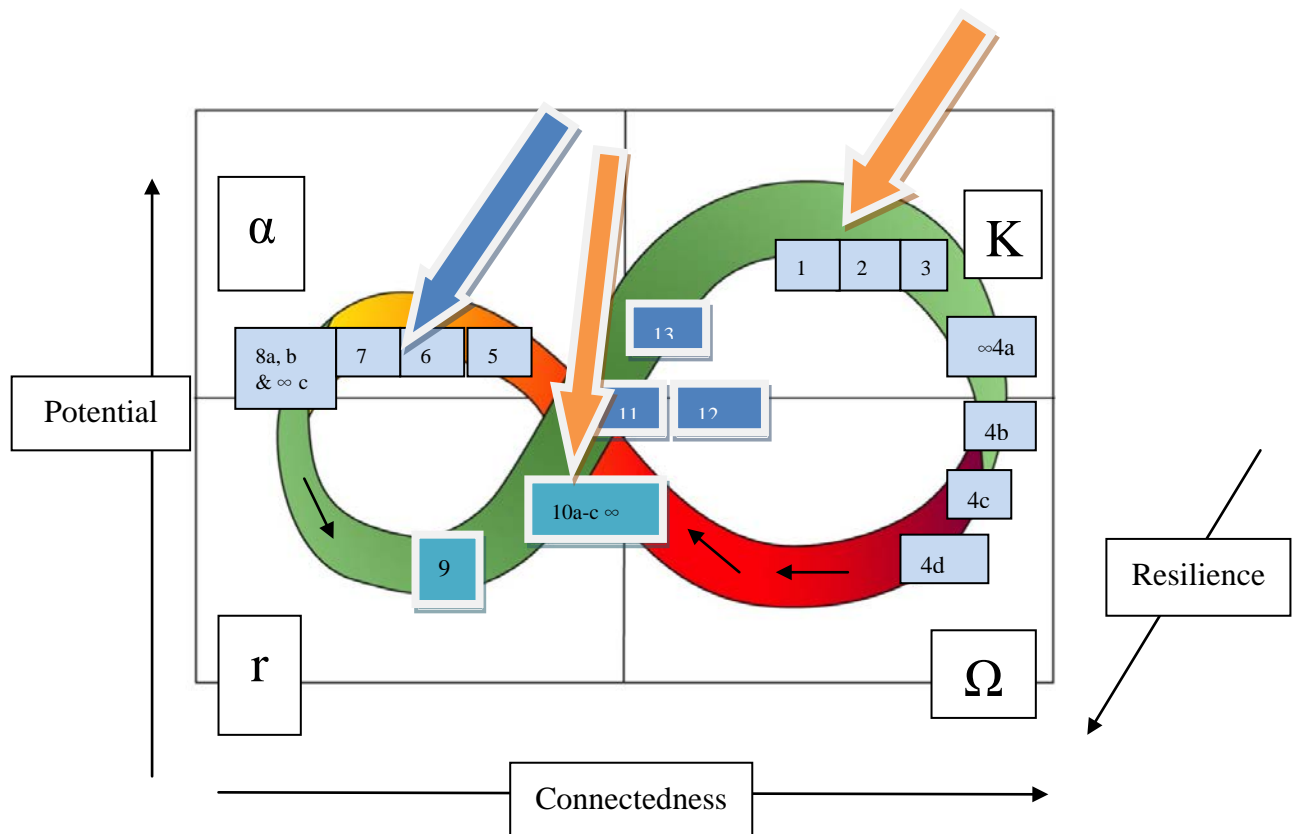


Figure 6.1 L5's learning from Lesson 3 to Lesson 12 expressed metaphorically as a Holling's (2001) adaptive change cycle. The blue arrow represents ecological remembering; the orange represents disturbance.

For reasons of space constraints all extracts for this chapter are contained in Appendix 9. Nine of the thirteen extracts are drawn from Lesson 3. The remainder are drawn from Lessons 9 to 12. L5 and her learning partner L2, along with their classmates L3 and L7 chose to focus on a critique of tourism New Zealand's global *100% Pure NZ* campaign that began in 1999 and included France (Tourism New Zealand, 2009). The advertisement has been the subject of academic, political and media criticism due to apparent discrepancies between the exaggerated claims of environmental purity in the advertisement and high rates of agricultural water pollution and biodiversity declines in New Zealand (BBC, 2011; WWF, 2012; Galtry, 2013; Joy, 2013; Foote et al., 2015; Desmarais, 2015). The students were invited to take on the task of representing a conservation project to a French audience in French in the light of this controversy.

The focus of this chapter is on their key idea contained within their podcast. L5 states in the last line:

« A ce moment la Nouvelle-Zélande n'est pas l'endroit propre est vert que nous croyons être mais peut être avec les projets comme l'Ile aux Cailles il peut être un pays où nous pouvons être fier. »

“At the moment New Zealand is not the clean and green place that we believe to be but perhaps with projects like Quail Island it can be a country where we can be proud.”

I chose this particular idea because it is highly likely that her response was inspired by her experiences in Lesson 3. This lesson dealt with the notion of the existence of innate human habitat preferences in the form of ideal primeval landscapes as an element of biological human nature or epigenetic rule as encapsulated in the savannah hypothesis (see Wilson, 1998; Dutton, 2010; see Lesson 4). In Lesson 3, students were invited to consider the savannah hypothesis in relation to their own landscape preferences along with prominent New Zealand landscape paintings and an environmental critique of Tourism New Zealand's use of landscape to market itself as a tourist destination. In this way, L5's idea could provide an example for the utility of art as a mean to create connections with other learning domains of Biology, Psychology, Geography and other Social Sciences, but also serve as a device to stimulate discussion in the language class context.

L5's idea may have resonated with the other student partnerships and may constitute an example of revolt. I consider a possible example of the reverberation of an idea and its evolution across a system of interconnected ACCs of differing scales; that is, across a panarchy.

In the following passages I briefly outline the structure, contents and theory of Lesson 3 (See Appendix 1). This is followed by L5's development of her key idea and its impact on the teacher, and L2 and L7.

Lesson 3 Outline and Theory

The teacher conducted Lesson 3 entirely in French. The lesson exposed students to four controversial ideas and artefacts that were connected through the theme of authenticity. I considered the authentic to be an expression of the social instinct of discernment of the motives of others and as a means to control unpredictability in the social environment (see Pinker, 2002; Wilson, 1998, 2012; Fiske, 2004; Baumeister & Leary, 1995; Dunbar, 1999). It was probable that this information was not clearly understood in Lesson 3, as the teacher informed me that students were having difficulty with the connections between the topics and lessons (see Chapter 7 Discussion). Consequently, I was invited in Lesson 6 to clarify these points.

Lesson 3 was divided into five parts (see Figure 6.1). Students firstly considered the notion of human habitat preference in the form of an epigenetic rule (see Chapter 2) for a common ideal landscape. That landscape is considered to resemble the African savannah that represents ancestral collective memory of the habitat for which we evolved. This idea is articulated as the savannah hypothesis (see Lesson 3 Appendix 6). The savannah hypothesis predicts that people of all cultures have an innate predisposition towards the primeval original / authentic landscape in which they evolved namely the African Savannah. For Lesson 3, I equated 'the original' with 'the authentic' making it possible to argue that it was possible to make a connection with the authentic object. The savannah is a place with which we make a connection, feel at home or for which we have a sense of belonging. As the savannah is original and authentic we have a tendency to desire it and reproduce it wherever we can (see Dutton, 2010). Secondly, students considered paintings of New Zealand landscape artists

such as Brent Wong and Colin Mahon in relation to their own ideal landscapes. Students were asked to say whether the New Zealand landscape paintings corresponded to their ideal landscapes. My motive in setting up this question for students was that the role of an artist is to reveal the truth about human nature (Wilson, 1998; Pinker, 1997). Pinker (1997) cites the Russian playwright Chekhov who reportedly said that man will only change when we show him what he is like. In this way, I believed that the landscape artists such as Colin McCahon may have wished to communicate the real New Zealand imbued with the despair that comes with severe ecological modification (cf Brown, 1997; Pound, 2009; Alderton, 2015). In this instance I equate real with authentic. McCahon believed the land was spiritually transformative all that was necessary was a 'leap of faith' to bond with it and return its love as though it was the suffering body of Christ. In this part of the lesson students were invited to consider if the paintings reflected the ideal primeval/original savannah landscape and their ideal landscapes? Also implicit in these challenges were the themes of authentic landscapes and belongingness presented in Lesson 2 (Appendix 1). Thirdly, students were reminded of the role of authenticity in the Unit of Work as the common strand that ran through the topics. The use of authenticity as a means to thematic integration and the challenges it posed are discussed in Chapters 3 (Theoretical Framework) and chapter 6 (Discussion). Next, students were asked to consider the authenticity of the *100% Pure New Zealand* advertising campaign launched in France in 2007 (Tourism New Zealand, 2009). The students watched an interview with Prime Minister John Key where British journalist Stephen Sackur challenged him on New Zealand's environmental record in relation to the commercial (see BBC, 2011). Lastly, students were given the task of sorting relevant information with regard to how the French saw the environment in comparison to New Zealanders. Students were then asked to decide how they would represent New Zealand to the French with regard to the controversy surrounding the advertising campaign.

Savannah Hypothesis and New Zealand Landscape Paintings

In Lesson 3, students were exposed to and discussed the work of five New Zealand landscape artists. They were three internationally recognised painters: Colin McCahon, Brent Wong and Maryrose Crook; and two local lesser known painters, Jane Harper and Diana Adams, who treated the landscape of Banks Peninsula that was likely to have been familiar to the students and teacher.

Colin McCahon (1919-1987) portrayed the New Zealand landscape as dark, stark, beaten and lifeless, indistinguishable from the suffering body of Christ that demanded recognition and love (Brown, 1997; Pound, 2009; Alderton, 2015). Brent Wong's landscapes are characteristically barren and lifeless featuring empty houses. His works often featured strange and floating architectural forms all painted from memory (Wong cited in Keyse, 2009, 2012). They create an eerie, dreadful and uneasy atmosphere (Keyse, 2009) and are said to embody the internal sentiment of the artist's anxiety and emptiness projected to the outside, as though to say that the hollowness is all pervasive, it is indoors, outdoors and within (Trussel, 1977, Keyse, 2009).

Another artist whose work I included in the unit of work was Maryrose Crook. She was artist in residence at School#2 and the teacher spoke of her in a manner that suggested that the students may have been familiar with her and her work (Appendix 5 Lesson 3 Tape script). A frequent theme in the paintings of Maryrose Crook is mourning in response to the death of her sister. This loss is symbolised by extinction. She used the forest birds of the South Island kokako (see *'Lamb of Constant Sorrow'*, 2006) and the huia (see *Extinction*, 2011) (Crook as interviewed by Hill, 2010).

Local Christchurch artist Jane Harper was doubtless familiar to the students having made the cover of the Christchurch Telephone Book in 2010. Her painting *So close yet so far* (n.d.) pictures four 'baches' or holiday homes on the beach at Boulder Bay near Christchurch. The homes abut a barren grassy hillside. The slope features an ominous slip that has torn away from the slope and appears to threaten the baches below it. Neither the artist nor the judges comment on the slip, but instead focus on the proximity of Boulder Bay to the city and its recreation value. Full time landscape painter Diana Adams resides in Governors Bay in Lyttelton Harbour. Her two paintings *French Hill* (2009) and *Lyttelton Harbour Nor'wester* (2010) appear to reflect her attempts to depict the otherworldliness which she calls "...the ethereal qualities..." in contemporary New Zealand landscape (Adams, 2015).

L5's Response to the Savannah Hypothesis - Disturbance 1

The underpinning principle of this part of the lesson was the Freirean structure of Own Story, Expert Story, Critique and Evaluation (after Jensen, 2011). Students were confronted with a phenomenon which they explained in their own manner called Own Story. This was followed

by readings that contained the Expert Story. Students were then invited to Critique and Evaluate the Expert Story.

For homework students were asked to sketch their ideal landscape and place within it a place of habitation. They were to write a description in French of their landscapes and present them to the class. The teacher reviewed the student landscape drawings.

Each student read out a description of their landscape in French. The teacher said that in the research on the savannah hypothesis the subject never included cities in their illustrations of their ideal landscapes (see Extract 1a Appendix 8).

The students then compared their drawings to those done by students at the national School of Architecture in Grenoble, France (ENSAG) (see Appendix 1 Lesson 3 student handout). The participants noted that their drawings were similar with the notable exception that the students at School #2 did not include animals in the vistas below their habitation and that they all lived near a city or in a city (i.e. L7).

The teacher asked the class to explain why people draw such landscapes. L5 said that it was because it's easy (see Extract 1b Appendix 8). The teacher then summarised the main idea of the upcoming readings that proposed that the similarity of the drawings could be due to an innate collective memory of the African savannah as their ancestral habitat¹. She asked the class what they thought about this. L5 exhaled rapidly through the nose giving an unvoiced snort laugh. This may have been an expression of a negative opinion as if to say "not much". Her classmates L2 and L6 said that they thought the hypothesis was possible (see Extract 1c Appendix 8).

Afterwards, at minute 7:20, students read, collectively translated an expert view of the savannah hypothesis and attempted to answer comprehension questions.

¹ No link was made between the landscape paintings and the savannah hypothesis – the paintings of McCahon and Wong do not conform owing to the lack of trees and other life forms. I explained this link to the students in lesson 4.

The text contained scientific language and many French-English cognates (see Lesson 3 Appendix 1). L5 and other unidentified students laughed at the similarity between the French and English translations. In general all the students relied on dictionaries rather than guessing. In regards the cognates, L5 complained that she did not recognise the words. It is possible that L5 feigned difficulty so as to down play her ability and to ingratiate the teacher who appeared to agree that the text was too difficult for them. The text also contained words that were unfamiliar to students that were not cognates. The teacher asked the class if the text was too difficult. The students agreed and the teacher summarised the text in French. This instance of students having difficulty with French cognates and vocabulary may constitute a barrier to using additional language classes as a venue for consilience teaching. I discuss this issue in Chapter 7 (Discussion).

Next, and over the noise of earth moving machinery² the teacher said in French that apparently we have in our heads and souls that which counts as the ideal landscape. She added that artists painted the New Zealand landscapes, and that they would look at them and formulate responses. She asked the class if the paintings corresponded to their ideal landscapes.

The teacher then continued in French to connect the theme of ideal landscapes, and artistic impressions of the New Zealand landscape with authenticity. According to the tape script for Lesson 3 the teacher said that as a class they would attempt to see what was authentic. The teacher did not link the savannah hypothesis to the ideal landscape drawings of the students or the landscape paintings and to the concept of authenticity. In fact the notion of the authentic was not explained clearly.

² Earthquake repair work occurring outside the classroom.

L5 Jokes about the New Zealand Landscape and the Class Laughs - Disturbance 2

Extracts 2-5.

Context.

This part of the lesson was also conducted entirely in French. The teacher introduced the next part of the lesson saying « *OK paysages de la Nouvelle-Zélande vus par les artistes* » (“OK landscape of New Zealand seen by the artists”). Students looked at the selection of New Zealand landscape paintings projected onto the using PowerPoint (Appendix 1 Lesson 3) and the teacher asked them to write in French how they felt on looking at them. They were supposed to do this without consulting their classmates.

On looking at Colin McCahon’s painting L5 asked L2 “what’s plain?” (Line# 18m55) and then repeated the question in a whisper. L1 thought L5 was asking about the word ‘plain’ in reference flat land which translates as « *la plaine* ». L2 intervened and said L5 was not referring to a landform but to the adjective. L5’s repeated her phrase with fried speech and slowly. After voiced laughter from students she said also in fried and descending speech, “not really”.

L5 appeared to be saying that the McCahon landscape was ‘plain’ in a negative sense of given the prosody of her delivery. The Merriam Webster’s Dictionary defines the adjective “plain” as: “lacking ornament”, “pure”, “unobstructed”, “evident or clear”, “common”, “ordinary”, “not complicated”, and “lacking beauty”. Given her negative prosody when pronouncing the word ‘plain’ and as she referred to McCahon’s painting in Extract 6b as « *pas intéressant* »’ (not interesting) (see below) it is probable that her meaning is closest to “lacking ornament” and “lacking beauty”.

Extracts 3-4.

Context.

The teacher then asked students for their thoughts and reactions in a few phrases in French. They began with McCahon’s painting *Six Days in Nelson and Canterbury*. The student reaction is presented below in Extracts 3, 4a-e and 5 below (see Figure 6.1).

What do the extracts show?

L5 said that the painting was a little boring. Two unidentified students agreed. The teacher asked them to clarify whether L5 meant the image of the landscape or the landscape itself was boring. Two unidentified students replied that it was the image. The teacher then asked the students if they recognised landscapes as represented in McCahon's painting. L5 took an intake of breath and said 'tout le temps' (all the time) and released an unvoiced laugh. This triggered voiced laughter from the class. The teacher then said « *partout* » (everywhere) as if to ask if this is what she meant by « *tout le temps* ». L5 agreed. The teacher then asked whether the fact that the McCahon landscapes are found everywhere makes them boring. L5 replied « *pas toujours, mais quelquefois oui* » ("not always, but sometimes yes") and burst into unvoiced laughter. This was followed once again by voiced laughter from the class. After a 1.2 second pause the teacher replied « *d'accord* » ("OK") slowly and loudly which was followed by a slightly longer pause of 1.3 seconds.

Discussion of what it might mean.

The teacher tried to clarify whether the students found the painting boring or the landscapes they depicted. Two unidentified students said it was the painting. When asked where one can see these "boring" landscapes depicted by McCahon, L5 said "all the time" and this evoked voiced laughter from the class. The joke and the laughter contradicted the former answer by the students that the boredom was in the painting, L5 said the boredom lay everywhere and the laughter from the class indicated that her classmates appeared to agree with her.

Note that the teacher responded to L5 by correcting her phrase, « *tout le temps* » (all the time) with « *partout* » (everywhere) to which L5 agreed with the correction and repeated the word « *partout* ». It is arguable that the correction was unnecessary. L5 was asked if she recognised the landscape in McCahon's painting and she replied "all the time", rather than everywhere. At this point it may appear that the teacher may have reasserted her authority over L5 as if to say she has control over the language. The teacher's correction may be example of corrective feedback (Ellis, 2005 p.15; Truscott, 1991; Seedhouse, 2001) in form focused instruction (FFI) (Ellis, 2005 p.12), whereby the teacher gives immediate feedback on unplanned speech or the learners 'interlanguage' (Richards, et al., 1992; Van Patten, 1996) and an example of indirect instruction (see Long, 1991; Fotos & Ellis, 1991; Fotos, 1993; Ellis, 2005).

The teacher then asked whether the landscapes are boring in reality. The teacher at this point appeared not to have accepted the L5's answer which was clear and unambiguous. L5 replied, "not always, but sometimes, yes" and broke into laughter and the other members of the class laughed³. The student appeared to avoid a direct answer that may have displeased the teacher, and the voiced laughter from the class could suggest that they believed the student was not being direct and that they all believed the landscapes were as boring as depicted by McCahon. L5's joke and the ensuing and ongoing class laughter appeared to have set up a tension between the class and the teacher, where the students through laughter may have formed a coalition of agreement in opposition to the teacher and could constitute a moment of rebellion.

If the coalition existed it appeared to be founded on the laughter that ensued from the unmasking of the New Zealand landscape as provoked by the painter McCahon which the students considered to be a true representation of their experience. That is, L5 appears to have stated the obvious or what she considered to be true, that could not until now be – the landscape is boring as depicted by the artist.

The teacher's apparent disagreement with the students' response to the McCahon painting may not be misplaced. McCahon did not deny the landscapes he painted were lifeless, monotonous and bleak (Alderton, 2012) and it is not surprising that the students and the teacher considered *Six Days in Nelson and Canterbury* to be boring New Zealand was for McCahon "a land with too few lovers" for this reason (McCahon cited in Leonard, 2015). However, McCahon strove through his work to communicate the real New Zealand beyond that of the tourist gaze: "I do not recommend any of this landscape as a tourist resort" (McCahon cited in Brown, 1997 and Alderton, 2015). He wanted his work to be for the local and he desired to reveal to them the Divine in that stark landscape, and encouraged the New Zealander to look past the monotony and communicate with the living force within the land (Pound, 2009). McCahon equated the New Zealand landscape with the suffering body of Christ that demanded recognition and love (Alderton, 2015). In return the land/Christ would

³ Note that there may be a connection of authorship between this ironic answer and the one L5 gave in Lesson 9 where she gets the teacher to admit to saying her work was "full of it".

afford spiritual transcendence. McCahon was frustrated with his audience's inability to hear this message and considered his work a failure (Alderton, 2015). In this instance the teacher did indeed love the stark and lifeless New Zealand landscape, feeling at home in it and drawing inspiration from it, but at the same time seeing McCahon's work as not reflecting her sentiments.

In summary, the students appeared to believe that the landscape depicted by McCahon was boring, and that the kind of landscape in the painting is encountered all the time and found everywhere. The teacher probably believed the painting was boring not the landscape. When challenged by the teacher, L5 modified the answer of 'all the time' to 'not always, but sometimes', which was met with laughter. Their laughter could suggest that this answer was not true, that they were telling the teacher what she wanted to hear.

Plotting L5's beliefs about the New Zealand environment on the ACC.

The above sequence of events (Extracts 3 -5) could represent a collapse for L5 which may have triggered an instance of revolt for the other students in the class, notably L2, L3 and L7. These latter students chose this topic for their podcasts.

In the following passages I focus on Extracts 3 to 4d. Extracts 4a-d comprise what I refer to as four micro-instances that constitute L5's response to the teacher's question in Extract 3. The sequence begins with L5's intake of breath (Extract 4a) that precedes her unvoiced laughter in the form of a pant (Extract 4b) and her joke in laugh speech (Extract 4c) which is followed by L5's voiced laughter (Extract 4d) which triggered voiced laughter from the other members of the class (Extract 4e) but not the teacher. It is possible that the period of disorientation for L5 occurred between Extract 3 and Extract 4a; that is between the teacher's question and L5's intake of breath. This means that L5's response could have been an intuitive making of associations (see Scheffer, Bascompte, Bjordam, Carpenter, Clarke, Folke, Marquet & Mazzeo, 2015) between McCahon's paintings, the landscape in New Zealand, and the claims that the landscape is attractive whereas she believed that the landscape was unattractive. In the instant between Extract 3 and Extract 4a there may have been therefore a period of disconnection and reconnection and thus a very brief moment of disorientation. For this reason I have plotted Extract 4a with a preceding infinite sign suggesting that L5 passed

through a micro-ACC after the teacher's question and before her intake of breath (see Figure 6.1).

L5's joke « *Tout le temps* » (“All the time”) uttered in laugh speech (Extract 4c) could constitute the verbalisation of a held belief that New Zealand landscapes are not as attractive as they are made out to be. L5 followed her joke with a voiced laugh (Extract 4d). This triggered class voiced laughter (Extract 4e) a sign of revolt (see Figure 6.1).

Of note is that L5 did not indicate that she rethought the quality of New Zealand landscapes in her exit questionnaire (Appendix 4). Her joke may indicate a decision to state what L5 considered a truth denied rather than the acquisition of any new knowledge. What therefore collapses is the mask of misrepresentation of the landscape. Consequently, the collapse may not represent the acquisition of new knowledge and the disintegration of old ideas, but figuratively an unmasking⁴. Her laughter, and the laughter of her classmates could be thought of as ‘the carnival laugh’ that entails the falling away of pretence (see Bakhtin, 1965/1984).

Note that Scheffer et al. (2015) point out that the majority of intuitions are incorrect and require verification. It is possible that L5's intuition and action to unmask the landscape was tentative and disorganised and needed clarification as indicated by her vague and ironic response to the teacher's questioning in Extract 5 (Lines 30-40). For this reason L5 left the collapse (Ω) phase of the cycle at Extract 4c and entered the re-organisation (α) phase at Extract 5. The teacher sought to clarify L5's meaning beginning with Extract 5 (Figure 6.1).

Extract 6 “The Bay”.

Context.

Extract 6 follows on immediately after Extract 5. The teacher asked the students for their response to Brent Wong's *Waves, Coast, Cloud* (see Appendix 1 Lesson 3).

In the previous extract, L5 expressed dislike for the McCahon landscapes that she claimed one recognises ‘all the time’ in the New Zealand landscape. However, in this extract she

⁴ Note the carnival laugh

stated that she liked the Brent Wong's landscape *Waves, Coast, Clouds, Sky* (Lines 12-17). She said it was calm; there was water, mountains, and blue sky (Lines 19-20). Then L1 said that the Wong landscape was a little like Banks Peninsula (Lines 22-23). L5 replied « *oui* » (yes) with a breathy intonation and lower tempo (Line 24-25). The teacher added that the painting reminded L5 of *The Bay and the Hills*⁵ (Lines 26-27). Finally, L6 added that the painting was like New Zealand (Lines 28-29). L3 replied that all the paintings were. L2 added that they are all by New Zealand artists.

Discussion of what it might mean.

L5's transcript evidence showed inconsistency in her preferences for the frequently encountered New Zealand landscapes and this suggests she may have been confused. L5 disliked the McCahon landscapes because they were "plain" and boring. She disliked Wong's *Green Roof* because it "clashed". She disliked the telephone book cover because the beach was not sandy. However, she said she liked Wong's sky painting, implying that it reminded her of her home in "The Bay"⁶ as inferred by the teacher. From L5's responses she may have seen herself largely surrounded by unattractive landscapes with the exception of her home at "The Bay". However, the manner in which L5 spoke of "The Bay" and the teacher's response to her could suggest that she may have been ingratiating the teacher, and thus puts her sincerity concerning her affection for the landscapes of The Bay into question.

L5 disliked the McCahon landscapes because they were "plain" and boring. She disliked Wong's *Green roof* because it "clashed" (Lines #). She disliked the telephone book cover because the beach was not sandy (Lines #). She also said she recognised these landscapes 'all the time' or 'everywhere'. She said that not only were the images in the painting boring but the landscapes themselves were boring. We can infer from these comments that in general L5 did not like the New Zealand landscapes she encountered on a regular basis. However, she appeared to make an exception for Wong's landscape agreeing with prosody reminiscent of sentimentality and nostalgia. The teacher appeared to recognise her effort to communicate

⁵ 'Hills' probably refers to The Port Hills that separate Christchurch from Lyttelton Harbour.

⁶"The Bay" is a pseudonym for the location of L5's home.

these emotions and completed what she may have thought was L5's unstated reference to L5's home in The Bay. The teacher may have been attempting to take command of what may have been L5's attempt to ingratiate her with the reference to her affection for the region. L6's comment in Lines 28-29 is informative. L6 was an exchange student from the United States. Up to this moment she did not understand that the paintings were of New Zealand. She said that the Wong painting was like New Zealand, in the inferred sense that it represented much of New Zealand.

L5 appeared to like Wong's *Waves, Coast, Clouds, Sky* (n.d.) painting because it reminded her of her home in The Bay as inferred by the teacher. However, she expressed dislike for landscapes by McCahon, the Wong painting *Building with Green Roof* and the cover of the Canterbury 2010 telephone book representing *Boulder Bay near Taylor's Mistake* in Christchurch by Jane Harper, because the beach was not sandy.

Plotting L5's beliefs about the New Zealand environment on the ACC.

L5 showed inconsistency in her preferences for the frequently encountered New Zealand and this suggests she was confused. This suggests a conflict of interest. One hand she stated an emotional connection to the landforms of The Bay and the hills as reflected in Wong's *Sea* but not for the ubiquitous plain and boring landscapes depicted in the other paintings. As identified by L6, the Wong painting that reminded L5 of her home reflected what was typical about New Zealand. Possibly, L5 only liked the landform of The Bay because it was home. If she did not live there she may consider it also plain and boring.

I have plotted Extract 6 at the summit of the Re-organisation (α -phase) back loop with weak connections to her values, low resilience to change through inputs from the exterior and a high potential for change.

100% Pure New Zealand – Disturbance 3 - “oh! yeah.”

Extract 7.

Context.

In the next phase of the lesson the class watched the 2007 version of the television and cinema advertisement ‘Forever Young’⁷ promoting New Zealand as a tourist destination for European audiences (ref). The commercial was part of a global campaign to market Aotearoa through the brand ‘100% Pure New Zealand’. The brand was developed by the advertising company M & C Saatchi for New Zealand Tourism. From 1999-2004, income from tourism increased 7% and became New Zealand’s largest income earner making up 9.2% of the country’s GDP and worth \$20 billion per year (McClure, 2012). The advertisement promises a youthful innocence and timelessness that are qualities of paradise and utopia. In this ideal place the landscape is beautiful, clean, pristine, undiluted and de-humanised⁸. The campaign was considered a natural extension of the extant image global consumers had about country of unique, innovative, ideal for visiting and investing (Yeoman et al., 2015) of natural and unspoilt beauty that had existed since the nineteenth century (McClure, 2004).

The teacher asked the students if they agreed with the image of New Zealand projected in the commercial. Extract 7 records their reactions and the teacher’s response to them. The exchange between students and teacher is entirely in French. English translations follow in bold Calibri font.

⁷ The advertisement can be accessed through the *Te Ara: The Encyclopedia of New Zealand* website: <http://www.teara.govt.nz/en/video/23206/forever-young>

⁸ Note that the students’ ideal landscapes were all humanised in the sense they included cities (see Extract 1). Note also that L7 considered both the artworks and the advertising campaign misleading as they failed to show the presence of cities (see Extract 4e (ii) Lesson 8 discussed in the penultimate section of the main body of this chapter).

What does the extract show?

The teacher made an incomplete sentence expecting a student to complete the last word: « *et en gros le pub prétend⁹ que la Nouvelle-Zélande est..?* » (“and overall the ad claims that New Zealand is...?”). L5 completed the teacher’s sentence with « *vert* » (green) uttered in unvoiced laugh speech. L2 responded to L5’s answer with voiced laughter. L6 appeared to ignore the laughter and offered the teacher the adjective, « *jolie* » (pretty). The teacher also appeared to ignore the laughter from L5 and L2 and completed her own sentence repeating L6’s adjective adding « *vert* » (green) and « *pur* » (pure)¹⁰.

L5 said that perhaps we have all the things shown in the commercial but it is a little “different”. Note that she uttered the word ‘different’ in laugh speech (Lines 19-20). L2 immediately agreed with L5 (Line 22). The teacher then said answering her own question that all the landscapes shown in the commercial exist (Line 24). L5 and two other students agreed. However, L1 said that they did not exist everywhere. L1 mispronounced the word ‘partout’ (Lines 29-31) and the teacher repeated her phrase with the correct pronunciation (Lines 32-33). After a pause of over two seconds, the teacher said that in the commercial there was a reality all the same (Line 35). L5 immediately responded with an exclamation “oh yeah!”. “oh” was uttered in unvoiced laugh speech, and “yeah” spoken in a declining and serious tone (Line 36). L5 utterance is reminiscent of the ironic or sarcastic colloquialism or expression of disbelief, ‘Oh yeah, right’ (CDO, n.d; Tepperman, Traum & Narayanan, 2006.) which could be interpreted inversely as, ‘Oh no, wrong’. L3 said “non” (no) in response to the teacher’s statement in Line 35. The teacher responded in latched speech with a questioning “non ?” (no?). L3 replied in very hesitant speech involving ‘code switching’¹¹ that the commercial

⁹ In the composition of this lesson I deliberately chose the French word ‘prétendre’ (to claim) for its closeness to the English verb ‘to pretend’. I did this to inject my bias into the text that as a means to provoke discussion.

¹⁰ The adjectives in French generally accord with the noun they describe. New Zealand translates as *la Nouvelle-Zélande*, a feminine noun and thus adjectives to describe it should also be feminine; that is, *la Nouvelle – Zélande est jolie, verte et pure*.

¹¹ Code switching involves shifting from the target language to the speaker’s native language in the same utterance (Hall & Nillep, 2015)

was not like her life. The teacher responded very rapidly repeating L3's sentence but adding that there is a reality and ended her utterance with, "OK!"(Line 43-44).

Discussion of what it might mean.

L5 and the other students that participated in this French discussion did not agree with the message in the 'Forever Young' commercial. The consensus appeared to be that the commercial did not represent their lives. The teacher insisted that the landscapes portrayed in the commercial were real. L5 responded to the teacher's insistence with ironic agreement. L5's accord could suggest she thought the teacher was refusing to see a reality that was obvious to L5 and her classmates.

Plotting L5's beliefs about the New Zealand environment on the ACC.

L5 disagreed with the *100% Pure* advertisement. L5's position was echoed by her classmates L1, L2 and L3. It is possible that L5's opinion at this stage was consolidating. In this way her view of the New Zealand landscape disconnects progressively from the teacher's valuation of those landscapes. In this way her idea is pushed further to the left in the α -phase (see Figure 6.1).

Sackur-Key Interview – Disturbance 4 - "Yeah eighty percent pure come here!"

Extract 8.

Context.

Extract 8 follows immediately on from Extract 7. In this phase of the lesson the students listened to the 2011 BBC 'Hardtalk' interview with New Zealand Prime Minister of John Key in which Stephen Sackur questions the validity of the *100% Pure* brand in relation to the country's environmental performance. The teacher asked the students in French to identify the essential argument of the journalist and the main ideas in the response of John Key.

The essential elements of the interview are as follows. Sackur challenged Key with statistics from the New Zealand Ministry for the Environment and environmental scientist Mike Joy of Massey University (BBC, 2011). 90% of lowland rivers are polluted and unfit for drinking and bathing; 43% of lowland lakes are also polluted; and the number of threaten and critically

endangered species continues to rise. John Key argued that the findings of scientists in particular those of Mike Joy in regards to the state of the environment were opinion. He made the case that scientists were not unlike lawyers and did not often agree. Key argued that the ‘100% Pure’ brand refers to environmental performance relative to other developed countries.

Extract 8 records the participant reaction to the Sackur-Key interview. Extract 8 is divided into three parts. 8a records the lead up to the recording and indicates that L1 had already seen the interview and said this excitedly and in a whisper. She also exclaimed quietly, “Oh this is awkward”. To aid continuity I have included the transcript of the salient part of the exchange between Sackur and Key in 8b without conversation analysis notation¹². 8c records participant response to the interview. In 8c, L5 said the journalist had a point.¹³ Only 8c contains L5’s response and I focus on her.

What does the extract show?

Extract 8c shows the build up to the second of L5’s jokes in French in Lesson 3. In this instance she attempted to facetiously revise the advertising campaign slogan to “80% Pure” (Extract 7c Lines 39 -58). L5’s joke appeared to be triggered by the teacher’s statement in French that it is true we are not ‘100%’ Pure. The teacher stressed “100% Pure” as if to say it is impossible to be perfect.

L5’s joke was preceded by a mix of voiced and unvoiced laughter and intakes of breath that gives the impression she was experiencing a moment of insight; that is, an epiphany (ref) (Lines 91-92). The point L5 seemed to be making is that although “80% Pure” as a slogan for New Zealand may more accurately reflect the reality of the state of the environment, it did

¹² I use CA primarily to decode participant utterances.

¹³ Extract 8 is noteworthy because it shows that students L1, L3, L5 and L6 are able to follow a discussion in French and contribute even though their responses are short, hesitant and incomplete. L2, L4 and L7 appeared by and large left out. The extract also demonstrates the collaborative means by which students help one another to finish a phrase.

not have the same appeal as “100% Pure”. No-one in the class responded to her joke (Line 91-92). In Line 93-97, L6 aided by another student and the teacher, added in alignment with the John Key’s argument that New Zealand is purer than other countries. L1 then said that all advertising slogans are prone to exaggeration (Line 99-100). L5 repeated her joke in French adding the phrase in laugh speech, « woo viens ici ! » (woo come here!) (Lines 105-107) as if to emphasise the irony of the incongruence of expressing enthusiasm and promoting something that did not merit it. When only her partner L2 responded and supported her through laughter and contribution (Lines 108-109; Line 112), L5 repeated her joke in English (Lines 113).

Discussion of what it might mean.

L5 considered the *Forever Young* commercial did not reflect her experience. L5 agreed with the criticism of the ad campaign as being misleading. L5 made her joke in French, repeated and added to it in French. When only her friend L2 responded positively to it, she repeated her completed joke in English supported by L2. In a sense L5’s joke appeared to fall flat with the class both in French and English. Her persistence and translation of the joke into English suggests that she believed she needed to make it clear for the class that that they did not laugh because they did not understand.

The content of L5’s joke is probably ironic. Irony is non-literal communication that conveys the opposite meaning to what is said literally (Boxer, 2002) (see Chapter 5 Extract 1 for another example of L5’s use of irony). Thus L5’s echoed meaning of her comment: “Yeah, eighty percent pure, come here!” (Extract 8c, Line 113), is likely to be, “Nah, eighty percent pure, don’t come here!”

The fact that L5 repeated her joke in French and when there was little response from the class she repeated it in its completed form in English suggests that her joke was intended for the amusement of the class. She may have been seeking a repeat of the laughter she received for her first joke in reference to the Colin McCahon painting (see Extracts 4b) In this way, L5 may have been seeking to create a second revolt.

Laughter may reinforce and disrupt hierarchies (Alexander, 1986; Rodrigues and Collinson, 1995; Reid et al., 2006; Pinker, 1997; Stillman et al., 2007) Laughter may signal allegiance to

the teacher or dominant pupils as well as a means to display resistance to hierarchy. L5's laughter could be described as mocking. Her tone could be interpreted as a display of resistance to the teacher's beliefs and seeking to have the laughter spread like a rebellion, thus seeking group acceptance of her own beliefs.

In his essay *Le Rire (Laughter)*, first published in 1900, Henri Bergson argued that laughter was a means to create social conformity through chastisement. Laughter for Bergson was targeted chiefly at behaviour that was considered maladaptive to the social and natural environment. Laughter in this sense was a sort of social punishment (Bergson, 1940/1999). In this second instance, L5 joked to rewrite the advertising slogan as "80% Pure New Zealand". The humour here could also be seen as chastisement in the form of a kind of auto-derision or self-mockery. Through her mocking laughter, L5 may have been suggesting that we as human beings are maladaptive in the way we respond to the exaggeration and psychological tricks of advertising. L5's joking and laughter in Extracts 4 and 8c could have served as attempts at a call to reason; a call to be listened to and address the situation. In this way, L5's laughter and its spread to the rest of the class in Extract 4 was arguably a form of social chastisement directed at the teacher.

Plotting L5's beliefs about the New Zealand environment on the ACC.

In terms of the ACC, Extract 8c represents L5's response to textual wisdom in the form of the BBC critique of John Key. The inclusion of this interview was a conscious effort on my part as the author of the lesson 'to seed the ground' prepared through the planned disturbances of the savannah hypothesis and New Zealand landscape paintings.

If L5 was in a state of disorientation then she would have been attempting to make sense of the BBC interview. Her joke in English translation is ironic and indirect. The oblique nature of her joke suggests that she was testing the boundaries of acceptance in regards to joking about New Zealand (see ref for adolescent use of irony).

L5 appeared to be moving to the point where she was about to choose a course of action, that she had exhausted the incoming information and resources of her peers, the teacher and the texts and has chosen a belief.

L5's joke fell flat with all except L2. This could have been due to its bad timing. L5 made this joke at the re-organisation (α) phase of the ACC. As her classmates had already laughed at her first joke, they would have had fewer connections, higher resilience to another disturbance, with lower energy and lower potential for change or collapse. Even though Potential for change in the back loop is relatively high, it is a different kind of Potential than that experienced at the top of the front loop at Conservation (K). Change in the back loop is due to an exhaustion of affective and information resources required making a decision on a course of action to resolve confusion and uncertainty provoked by disturbance. It is not a period for dramatic Collapse as experienced between K and Ω .

Extract 9 - in which L5 declares, « on n'est pas vert ! »

Context

Extract 9 occurred just under ten minutes after the conclusion of Extract 8. In the interim students attempted the Trash and Treasure exercise (Appendix 1 Lesson 3). In this exercise students sorted statement about French beliefs regarding the environmental in order to decide how to present New Zealand to the French public as a tourist destination. This extract reveals the last moment of a possible difference of opinion between L5 and the teacher.

What does the extract show?

The teacher asked the class to tell her what was the most important idea about New Zealand to present to the French public. In this instance L5 said that she would tell the French directly that « *on n'est pas vert* » (“we are not green”). To this the teacher repeated her proposition. L5 began to speak and the teacher interrupted her and repeated her question to the class again but with greater intensity.

Discussion of what it might mean.

L5 stated that New Zealand is not green in an unambiguous fashion for the first time in Lesson 3. This she said was the most important idea that she wished to relate to the French public. In this way, L5 appeared to have crystallised her belief about the state of the New Zealand environment and the apparently misleading message of the ‘100% Pure’ advertising campaign. In response the teacher restated L5's proposition in a manner to seek verification

that she was sure of what she had said and the importance. When L5 tried to reply the teacher appeared to override her and restated her question to the class. It was likely that the teacher was expressing disapproval at L5's answer. In this instance the teacher appeared to have been scaffolding with L5 (see Fraser, 2013 p.21 see Chapter 1). That is, she may have been urging caution prodding L5 to see the possible gravity of her statement on the World Wide Web.

Plotting L5's beliefs about the New Zealand environment on the ACC.

Note that L5 and L2 chose to treat the topic of the true state of the New Zealand environment for their podcast. In this light, in making her firm statement in this extract, L5 may have left the Re-organisation phase of the ACC and thus selected a potential course of growth and development. The fact that L5 maintained her belief that 'we are not green' in spite of the teacher's indirect opposition implies that L5's idea had high resilience, low connectivity and a low potential for change. For these reasons I have plotted Extract 9 on the cusp of the Disorganisation (α) and Growth (r) phase (see Figure 6.1).

Extract 10.

There is no reliable evidence in the data set of the further development of L5's idea that New Zealand is not green until Lessons 9 and 10. Extract 10 is divided into four parts taken from Lessons 9 and Lesson 10. The lessons took place 38 and 30 days after Lesson 3 respectively.

In the following passages I describe firstly what happened in period leading up to Lesson 9. After which I outline the events and their consequences on L5's idea development that occurred in Lesson 9 and 10. The four extracts reveal the impact of the teacher's negative feedback on L5's work in Lesson 9. L5's progress slowed down and she became disengaged. The criticism did not result in changes to L5's message in the podcast nor interfere with its completion.

In the interim between Lesson 3 and 9 there were three other teaching lessons. I conducted Lesson 4. This was an interactive lesson that explained in French the ecological values of Quail Island. L5 was absent. Lesson 5 featured a study of the Maori values of Quail Island. A guest from the Maori community at Rapaki gave a lecture to the students. The students summarised in French her key points (see Lesson 5 Appendix 1). Lesson 5 is significant for L5 because she stated in her post-unit questionnaire that she was moved by the

representative's contribution. In Lesson 6, I took the lesson in French and in English clarified the connections between the lessons and explained the views of the Quail Island experts in relation to conservation and ecological restoration. This lesson was significant because it exposed that the spontaneous spoken French ability of the students was below the *NZC* Proficiency descriptor level; that is, it was unlikely that students could give long coherent utterances on an unfamiliar topic without preplanning and coaching. This aspect is discussed in detail in Chapter 7 (Discussion). Lessons 7 and 8 were allocated time for students to work with their partners to prepare their podcasts. During these two lessons L2 and L5 worked out of range of the digital recorders. In keeping with ethical standards no attempt was made to interfere with their decision to do this.

Extract 10a.

Context.

Lesson 9 involved tension between the teacher and researcher, the teacher and L5, the teacher and L4 (see Chapter 5.1 Extract 23). In the moments leading up to the lesson the teacher told me she thought that I was “crow barring” courtly love to fit into an environmental theme. She rejected Dutton's (2010) evolutionary psychological interpretation of art and performance as a skill display for potential mate selection, notably as this could relate to thinking about the students. She said that the students performed and produced art in order to feel good about themselves.

Lesson 9 was notable because it provides an example of L5's response to what she may have perceived as an unfair challenge from the teacher to her established and developing ideas concerning the separation of humanity from Nature as a cause of the destruction of Nature. The teacher said this idea was “odd”. The first reaction was for L2 to resist the criticism, and for L5 to placate the potential conflict between the teacher and L2. L5 agreed with the teacher and verbally blamed herself for writing what the teacher saw as odd (see Appendix # Lesson 9 Transcript #). Note that L2 and L5 did not change the idea content of their text in response to the teacher's criticism (see Appendix # Lesson 9 Transcript and Podcast transcript).

The teacher spoke to the class and told them she thought that the students were not thinking critically about what they were writing. They should give their opinion¹⁴.

The teacher said that she felt their work was "...a wee bit..." before interrupting herself. L5 asked the teacher whether she thought their draft was "'a wee bit' full of it". The teacher said "yeah well". L5 responded mocking the teacher's attempt to make her criticism indirect saying, "But not quite but 'yeah'."

Note in lesson 3 (Extract 3 Line#) L5 and the teacher had a lighter hearted exchange. The purpose of L5's irony appeared to be to make fun of indirect and diplomatic language used in criticism. In the above case, an interpretation of the non-verbal echo in L5's ironic statement is that yes the teacher thinks their work is "full of it". L5's comment did not result in laughter but instead signalled her disengagement.

Extract 10 b.

Context.

Extract 10b occurs a few moments after 10a and records the beginning of period of L5's distraction.

L5 in an ironic and mocking manner said that, "we should be saving the world not destroying it" (Lines 189-193). L2 said in response with unvoiced laugh, "insulting" (Line 194). The teacher did not have direct contact with the students L2 and L5 for the remainder of Lesson 9.

When L5 asked her if she thought her text was "full of it", the teacher agreed. This feedback may have resulted in a double bind for L5 whereby no action can lead to a positive outcome (see Chapter 5). By Lesson 9, L5's idea development was beyond a point of no return, in that the challenges may have served to render L5's idea more robust, complex, coherent and

¹⁴ The teacher made a good point. E.O.Wilson's consilience is scientism and he is opposed to the social constructionist narrative as an explanation for human nature. The students cannot be blamed for presenting only one angle as they were not given alternative expert stories to critique and evaluate. The apparent one-sidedness of the lessons could constitute a barrier to the acceptance and teaching of consilience (see Chapter 7 (Discussion)).

structured. The incident in Lesson 9 appeared to have left L5 disorientated and losing interest in the project.

The extract from Lesson 9 could constitute a disturbance at the growth (r-K) phase of the ACC. L2 and L5 did not noticeably change the content of what they had written in response to the teacher's criticism but corrected the language errors which she pointed out. L2 and L5 appeared to have been stalled by the criticism but this did not affect the outcome. Not unlike a metaphorical summer storm, it is possible that by Lesson 9 the students had sufficient resilience to weather the criticism.

Extract 10c.

Context.

At the commencement of Lesson 10 the teacher appeared to attempt to smooth over the tension generated in Lesson 9. L5 appeared to respond ironically, and the class laughed.

The teacher announced that she wanted the students to make more progress compared to the previous lesson (Lines1-3). L4 replied "yeah" (Line 4). The teacher also asked, "Do you feel better?", but interrupted herself and repaired her question asking whether they felt they were in a "better position" (Line 5). Two students replied «oui» in latched speech (Lines11-13) followed by L5 also in latched speech but in English. L5 said, "yes", very quietly extending the last consonant and making a hissing sound (Line 14). The class responded with strong voiced laughter (Line 15).

The teacher may have been directing her introductory comments at L5 given that the others in the class had worked comparatively well in Lesson 9. The quietness and extension of her utterance and that it was spoken in English after a sequence of *oui*'s, suggests that L5 wished to be heard and remarked through the contrast she had created. L5's response could be construed as irony with her echoed meaning being the opposite of the literal meaning. That is, she did not feel better since Lesson 9. Her reply in English could have suggested a protest of sorts where she told the teacher what she wanted to hear, but doing so under duress. The strong voiced laughter from the class that followed suggested that they recognised the tension between L5 and the teacher, the teacher's attempt to redress it, and L5's reluctant co-operation.

Extracts 11a & b.

Context.

Extracts 11a and b occurred in Lesson 10.

L5 and L2 talk about deforestation in order to create pasture for cattle farming and cropping and their role in climate change. L2 questioned whether crops had an effect on climate change (Extract 10a). L5 explained that cows were a source of methane (Extract 10b).

Extracts 12a and 12b.

Context.

In Lesson 11 the teacher was absent and the students prepared her leaving party. The teacher was absent and a relieving teacher was in charge and working with a junior class in the adjacent language laboratory (see Figure 1 Appendix 1). These extracts discuss L5's facetious treatment of the environmental theme and the last of L5's jokes about the 100% Pure advertising campaign.

Extract 12a shows L5 joking that ongoing deforestation would destroy the universe (Lines 614-616). L2 told her to stop being overly dramatic (Line 617), and both girls burst out laughing.

Extract 12b occurred a few moments after 12a and was part of the previous laughing phase. L4 asked what L2 and L5 were laughing at. L5 explained that in their podcast they would be saying that because the clean and green image was not true they should say that New Zealand was "dirty and brown". L5 then burst out laughing (Line 884-887). L2 repeated "dirty and brown" and also started to laugh. L4 who did not appear to find this funny said that she and the other students thought that one of either L2 and L5 had a button undone (Line 889). This sparked more laughter from both L2 and L5.

The joking and the laughter may indicate that students had exhausted the seriousness of the topic and had begun to make fun of it. L4's response to their joke is an example that shows that L4 and the group L2 and L5 were at cross purposes (see Footnote 23).

I have plotted Extracts 11 and 12 side by side on the ACC not far above Extract 10. This could express the near completion of their podcast and a feeling of being at a loose end before their performance. The mockery could also pay reference to her altercation with the teacher in Lesson 9.

Extract 13.

Context.

The students L2 and L5 recorded their podcast in Lesson 12. In order to provide the context of L5's key idea; that New Zealand is not clean and green as gleaned from the contents of Lesson 3, I review her podcast.

Their podcast can be divided into three broad parts: the holistic pre-modern world view and supposed respect for Nature; the modern world view and the divorce from nature and the environmental crisis; finally a critique of the *100% Pure* campaign and role of ecological restoration to redress the inaccuracies of the brand and to return to holism. I paraphrase their text below and comment on its coherence.

They explained the modern world view that sees humanity separate from Nature leads to thoughtless destruction of Nature. They introduced the holistic notion of the pre-modern. They stated that both medieval courtly love and the Maori world view share common ideas. Of the common ideas they said that Nature was important for the French, because they thought without it the world would not exist. They then stated that both courtly love and the Maori world view were means to express this connection with nature and its importance. They added that we should maintain this mode of thought and repair the environment.

The students' attempt to connect to the Maori world view appeared to lack cohesion and felt out of place. The incoherence and cryptic sound to the podcast appeared to be due to the lack of language linking devices and the thematic omission of the connecting theme of the authentic that was not made sufficiently explicit during the teaching of the unit. In Lesson 9 the teacher appeared to be responding to this lack of coherence. However, she did not provide sufficient feedback to eliminate these issues (see Extract 10). The proceeding passages in their text were more coherent.

In the next part of their text the students introduced global forest destruction. They said that this destruction was occurring “even in New Zealand”, where land was cleared for agriculture. The problem they said for New Zealand was that cattle and sheep outnumber people. They listed other environmental problems such as the habitual buying of non-recyclable plastics and global warming.

They then stated New Zealanders falsely believed that their country was clean and green. They warned that if New Zealand continued on its current path, it will become an ecological disaster. They added that it was possible to change.

Then they introduced the idea of sustainable development as a solution to resource depletion and that we should conceive a new way of living. They proposed the ecological restoration of Quail Island as a small but positive step towards this new way of living. The project aimed to reconstitute native forest to the island. They acknowledged that a single island cannot change New Zealand but they hoped the project would be an inspiring example for others setting off a “chain reaction”.

This brings us to L2 and L5’s closing sentence which is the focus of this chapter section.

The closing sentence in L2 and L5’s podcast states that New Zealand is not clean and green and that they believe with projects like Quail Island, the country could be a place where one could be proud. By inference, the students feel they do not possess national pride, because New Zealand is not clean and green.

There may be a cause and effect relationship between the realisation of the inauthenticity of the believed New Zealand image and their lack of pride in New Zealand. The students proposed a means to regain that national pride was through ecological restoration.

The New Zealand landscape was a source of national pride and identity. The New Zealand government’s attempt to promote the country with the brand of ‘100% Pure’ fed this sense of pride and identity (Bell, 2006). Bell points out that a ‘...brand carries with it emotional dimensions: a set of qualities inviting trust and respect from a global audience of potential consumers.’ p.14). It is conceivable that by exposing the true state of the New Zealand environment as seriously polluted (see BBC, 2011 WWF, 2012; Joy, 2013; Foote, Joy & Death, 2015; Desmarais, 2015) and the 100% Pure marketing campaign as an attempt to

mislead the international community, could undermine both international trust, national pride and identity of New Zealanders (BBC, 2011 WWF, 2012; Joy, 2013; Foote, Joy & Death, 2015; Desmarais, 2015).

Plotting L5's beliefs about the New Zealand environment on the ACC.

L2 and L5's closing statement appeared reflective and mature, and did not contain the jadedness and concomitant flippancy expressed during Lesson 11 (see Extract 12). It is possible, but unlikely given L5's strong feelings regarding the true nature of the New Zealand landscape, that she was just playing to the recorder and that she was being insincere.

Their idea that New Zealand was false but could be made authentic through ecological restoration has a certain hopefulness and youthfulness. Their idea had the potential to make new connections with the future through a turning towards sustainable development and the pre-modern holistic world view. In this way resilience is relatively high, and it's potential for collapse relatively low. For these reasons I have placed the idea between growth (r) and conservation (K) (see Figure 6.1)

L3 and L7 : « ...c'est que ce que nous voulons voir n'est pas la réalité. »

“The problem is what we want to see is not the reality.”

Extract 4e.

Context.

The aspect of the L3 and L7 podcast I focus on is the reference to landscape painting as it pertains to the *100% Pure New Zealand* advertising campaign. I suggested that the decision to choose this topic may have been elicited by the joke told by L5 in Extract 4b and that this joke started a panarchic revolt (see Chapter 4). In the following passages I discuss this proposition. Is there sufficient evidence in the data set to argue that L5's joke influenced the decision of L3 and L7 to discuss landscape painting in their podcast, or was their decision based on other stimulation?

L3 and L7's text deals expressly with the controversy surrounding the *100% Pure New Zealand* advertising campaign. Extract 4e below is a transcription of L3 and L7's draft that they co-operatively read in a rehearsal during Lesson 10.

At the end of Lesson 12 the teacher informed me that L3 and L7 would not be submitting a podcast as the standard was not good enough. Evidence from the tape scripts reveals that L7 had difficulty with both spontaneous spoken French and with vocabulary and grammar. The teacher informed me that L7 was failing.

It is likely that her performance on the day of the recording was less than acceptable and this explained the teacher's decision to discard their recording. The teacher declined to allow me access to the rejected recording.

What does the extract show?

Their podcast makes thirteen points listed below. The items in italics appear to pertain to the '100% Pure' brand and/or New Zealand landscape art. The text lacked explicit logical connections between the following points: 3 and 4; 7 and 8; 12 and 13.

1. *In spite of some attractive scenery the advertising campaign is "definitely false"*
2. *New Zealanders do not want to admit this*
3. *John Key denied the statistical evidence of water pollution*
4. Our Maori culture has strong links with the environment
5. We believe that messages in the following Maori dictum are true: the people will survive if the meeting place of the forest and the meeting place of the sea survive
6. We are proud of this culture and promote it overseas but we do not like it.
7. Our connection with nature is lost
8. *The typical art of New Zealand represents an idealistic vision*
9. *The landscape is pure*
10. *The buildings, the people and the pollution are erased*
11. *The French are probably more careful with their environment*
12. *New Zealand tends to believe that all is well in the environment and don't acknowledge problems*
13. The pre-modern vision of New Zealand – as oneness with nature is not the reality.

Discussion of what it might mean.

L7 said that even though New Zealand has some (*quelques*) (Lines 2 and 5) beautiful beaches, forests and mountains the *100% Pure* brand is false (Lines 3-4, 5-6).

The choice to use the quantitative adjective *quelques* (some) may pay reference to: L5's joke 'tout le temps' (all the time) and *partout* (everywhere), the argument from the teacher in regard to the 100% Pure advertisement that the spectacular landscapes for tourist consumption do indeed exist, and L5's mocking laughter in response to the teacher's reminder.

L7's interpretation of the landscape art shown in Lesson 3 appears to differ from L5's and may show some originality. This novelty appears to be based on an error in the teacher's interpretation of the savannah hypothesis.¹⁵ L7 interpreted the landscape art as ideal representations (Extract 4e (ii) Lines 12-13). Note that the art was shown to the students for them to make comparisons with their own ideal landscape drawings and the savannah hypothesis. The point of difference noted by the teacher was that the students indicated that their habitation would be near a city (Extract 1a Lines 1-3) and L7 placed her house within a city (Lesson 3 Tape script). The teacher concluded that the savannah hypothesis "did not work" (Teacher-researcher debrief notes) for this reason. Consequently, it is possible that L7 seemed to believe that ideal landscapes are dehumanised and that the absence of signs of humanity in the artworks was an expression of this idealism (Extract 4e (ii), Lines 7-10) In this instance, both L7 and her partner L3 appeared to assimilate the teacher's interpretation and tried to make sense of it in relation to the additional information in the lesson. As it turns out L7's interpretation is supported in the literature. At the time of writing Lesson 3, I was not aware of McCahon's and Wong's deliberate omission of humanity (Alderton, 2015; Keyse, 2009, 2012). Nor was I aware of the same technique in the early version of *100% Pure NZ* advertisement (Bell, 2006). The purpose of dehumanisation of the landscape for Tourism New Zealand was to give the impression of emptiness, a low population, negligible pollution and opportunity (Bell, 2006). The novelty in L3 and L7's conception of idealism in

¹⁵ An error in meme transcription created novelty.

art and in the advertisement indicates the spawning of a new but related idea akin to the progeny of L5 but with variation. From a memetic view point there was an error in transcription that generated novelty.

L5's and L3 and L7's choice of language to describe New Zealand using quantitative adjectives (L5's ironic use of *tout le temps* and L3's use of *quelques* to quantify the true proportion of attractive landscapes) may suggest the sharing of an idea. L7's interpretation of New Zealand landscape art differed from L5's and showed originality. I have not found evidence in the data set that suggested a cause and effect relationship between L5's joke in Extract 4 and L7's choice of topics for her podcast.

Plotting L3 and L7's response on the ACC.

The instance of 'revolt' at Collapse (Ω) that goes beyond L5's learning cycle and connects with the learning cycles of both L3 and L7, remains hypothetical and cannot be substantiated by the data.

Summary

L5

- Extracts 2-4 may indicate that L5 unmasked the New Zealand landscape. The process of unmasking may constitute an epiphany like insight and therefore a collapse of her own facade vis-a-vis the landscape and a challenge to the pretence of the status quo.
- With the support of a coalition of students formed through her joke and laughter, she may have built a foundation of courage to challenge unambiguously the belief that New Zealand is clean and green, and to state her probably previously held but unstated belief that the McCahon landscapes are boring and ubiquitous. However, this foundation is shaky at this stage and requires testing. Extract 5 may constitute a moment of disorientation.
- Extract 6 could reveal the L5 may have been confused and suffering a conflict of interest over her stated landscape preferences. Her home at The Bay for which she expressed affection is not unlike the landscapes she regarded negatively. One could infer that either L5 only likes The Bay because it is her home, or that she in reality did not like The Bay but was ingratiating the teacher.
- L5's possible confusion which may have been dispelled through the teacher's questions and the incoming information of the video texts of the '100% Pure' advertisement and the critique of that by the BBC Hardtalk programme.
- In Extract 7, L5 disagreed with the representation of New Zealand in the '100% Pure' advertisement. L5's position was echoed by her classmates: L1, L2 and L3. It is possible that L5's opinion at this stage was consolidating. In this way her view of the New Zealand landscape may have disconnected progressively from the teacher's valuation of those landscapes. In this way, the idea that New Zealand is not clean and green comes closer to materialisation.
- In Extract 8 L5 used irony to mock the apparently false promises '100 Pure New Zealand' brand in relation to its poor environmental performance as pointed out in the Sachur-Key interview. She said, "Yeah, eighty percent pure, come here!" (Extract 8c, Line 113). L5 initially tried to her joke in French. When there was no response she translated it into English. Only her partner L2 responded to her. Her repeated attempts

to form the joke and the use of the indirectness of irony to communicate it, suggests the idea was still incompletely formed.

- Extract 9 came at the end of Lesson 3 and records students summing up with the teacher. The teacher asked the class how they would present New Zealand to the French public in relation to all that they had experienced in the lesson. L5 stated unambiguously that she would inform the French public that « *on n'est pas vert* » (we are not green). L5 maintained her belief despite the teacher's indirect opposition. L5's idea probably had concretised and showed high resilience, low connectivity and a low potential for change, and can be plotted at the cusp of the α and r-phase of the cycle.
- Extract 10 records the events in Lesson 9. The teacher told the researcher that she did not agree with the evolutionary psychology view of art and performance as a skill display (see Dutton, 2010). The teacher told the students that their ideas were not thought out before they had started writing, and also that they did not appear to be critiquing the information they had been given. The criticism of L5's work seemed to be directed at what the teacher considered was the strangeness of the ideas contained within; notably, that because we are distanced from Nature we destroy it without a thought. L5 asked the teacher if she thought their work was “full of it”? The teacher agreed. L5 became disengaged from the task and cynical in relation to the environmental message in their work. It appeared that the teacher had put L5 into a double bind where no matter what she did was wrong. L2 and L5 did not change the contents of their text in response to the teacher's criticism. Thus the L5's idea had high resilience, high connectivity but a low potential for change.
- In Extract 11 L5 talked about the role of livestock in deforestation and greenhouse gas production. She appeared disinterested. In Extract 12 L5 began to make fun of key messages in her podcast and this led to laughing fit with L2: she joked that ongoing deforestation would destroy the universe; and that rather than clean and green New Zealand should be thought of as “dirty and brown”. It appears that their joking about their message could suggest jadedness and an ongoing mockery of the unit contents as a response to the double bind of Lesson 9.
- Extract 13: In the closing statement of their podcast L5 one can infer that the realisation that the belief that New Zealand is clean and green has robbed them of their national pride. They concluded that this pride could be restored through projects

like the ecological restoration of Quail Island. Their idea appears sincere, hopeful and youthful. I have plotted their idea I between growth (r) and conservation (K) with relatively high resilience, with moderate connectivity but with the potential for new links through a desire for innovation, and given the openness to the future and the desire for change and adaptability they have a low level of potential for change through collapse (see Figure 6.1).

L3 and L7

- L3 and L7 argue that the landscapes represented in the '100% Pure New Zealand' advertisement do not reflect the lives of the majority of New Zealanders and New Zealanders do not want to admit this.
- L3 and L7 believed that the typical art of New Zealand represents an idealistic vision where the landscape is pure, and the buildings, the people and the pollution are erased. L7 probably understood that the ideal landscape according to the teacher's interpretation of savannah hypothesis did not include cities.
- The teacher's interpretation though not supported by the savannah hypothesis turned out to be a source of insight that overlapped with the literature that treated the work of McCahon, Wong and Crook, as well as the marketing strategy of the 100% Pure campaign where a dehumanisation of the landscape was deliberate and part of the projection of an ideal/abstraction of loss, essence, and emptiness that suggests cleanliness and opportunity - required to be filled by – the new frontier (ref)
- The insight derived from this instance is that variation in interpretation can be a source of inspiration.
- The views of L3 and L7 expressed in their podcast appear to be an expression of something thought but seldom if ever articulated given the compromise of national identity and national economic goals linked to tourism that entail the maintenance of the clean green mask. The novelty in the actions of these students may lie in the decision to voice their ideas to the French public on the internet and potentially reach a global audience.
- The evidence that L5's joke sparked the development of L3 and L7's decision to blow the whistle on the New Zealand landscape and the '100% Pure' brand is circumstantial and somewhat tenuous. It is more likely that L3 and L7's decision was

influenced directly by contents of the lesson and the participants' response to it than by the L5's joke and laughter in reference to McCahon's painting.

Summary of Chapters 5 and 6

L4's idea development and learning

1. L4 generated an original explanation for courtly love that was a consilience between Darwinian sexual selection, courtly love, pre-modern medieval world view, and her Christian beliefs.
2. L4 was unable to discuss and debate ideas in French. There is no evidence that she learnt in the target language but instead relied on translation and paraphrase of the translation from her classmates.

L5's idea development and learning.

1. Landscape paintings provided the occasion for L5 to examine her true sentiments regarding New Zealand and how she felt about her home at The Bay. The paintings also exposed or unmasked her pretention at liking the typical Banks Peninsula landscapes in order to maintain an emotional connection and favour with the teacher (see Chapter 6.2). This example may demonstrate the role of art to provoke and reveal genuine emotion. This carnivalesque unmasking of pretention and delusion is of importance for New Zealand's environmental movement where the branding of the country as 100% Pure may result in complacency in regards to taking conservation action as stated by L3 and L7 in their podcasts (see Chapter .2.2) (see also Bell, 2006; BBC, 2011; Foote et al., 2015; Desmarais, 2015 who support this view).
2. L5 could discuss and debate ideas in French using utterances of single short sentences. In spite of this limitation she could convey nuanced meaning. There is evidence that she learnt in the French.

L3 and L7's idea development and learning.

1. L3 and L7 argue that the landscapes represented in the '100% Pure New Zealand' advertisement do not reflect the lives of the majority of New Zealanders and New Zealanders do not want to admit this. L3 and L7 believed that the typical art of New Zealand represented an idealistic vision where the landscape was pure, and the buildings, the people and the pollution were erased. L7 probably understood that the ideal landscape according to the teacher's interpretation of savannah hypothesis did not include cities.
2. The teacher's interpretation, though not supported by the savannah hypothesis, turned out to be a source of insight that overlapped with the literature that treated the work of McCahon, Wong and Crook, as well as the marketing strategy of the 100% Pure campaign. The insight derived from this instance is that variation in interpretation can be a source of inspiration.
3. L3 could discuss and debate unfamiliar ideas in French using utterances of single short sentences but with code switching and lengthy hesitation. There is evidence that she learnt in the French.
4. L7 could not discuss and debate unfamiliar ideas in French. There is no evidence that she learnt in the French.

In summary, Chapters 5 and 6 have provided detailed transcripts from classroom lessons which reveal the moment by moment utterances of students L4 and L5 relevant to the development of their respective ideas. Each transcript extract has been presented in the context of the lesson, and has been analysed individually in order to identify the progressions and interruptions to the students' thinking and understanding as inferred and explained. Evidence from transcript and other sources of data have has been used to model the students' understanding in terms of the four phases and three dimensions of the ACC. The model was successful in demonstrating moments of collapse, re-organisation, growth and senescence. I was able to successfully plot these moments of the learning process through the use of metaphorical theoretical framework developed in Chapter 3 in combination with reflection on the meaning of each utterance in relation to similar instances recorded in the relevant the

literature. Lastly, the fact that the procedure used for the plotting of L4's idea development could be reproduced and applied to the idea development of L5, could suggest that this methodology is repeatable.

CHAPTER 7

DISCUSSION

RESEARCH QUESTION 2 – ENABLERS AND BARRIERS

RESEARCH QUESTION 3A – EVALUATION OF THE THEORETICAL FRAMEWORK

&

METHODOLOGICAL LIMITATIONS

Chapter 5 and Chapter 6 provided detailed interpretation of transcript extracts from classroom lessons that reveal moment by moment utterances of the students L4 and L5. Each interpretation of each extract has been presented in the context of the lesson, and has been analysed individually to identify the progressions and interruptions to the students' thinking and understanding as has been inferred and then explained. All extracts are presented in Appendices 8 and 9. The adaptive change cycle (ACC) has been used to model the students' understandings, and also to demonstrate moments of collapse, reorganisation, renewal, and growth and finally senescence. The methodology used to accomplish the representation of the learning sequence of L4 and L5 was the following. First, the key idea chosen by the student as part of the preparation for the student podcast was identified. Next, all relevant utterances in the form of extracts were located in the transcript and audio recordings. They were then analysed using conversation analysis (CA), supported by supplementary data and inference from the literature to generate a likely interpretation. This interpretation of the extract was then considered in terms of its stage in the ACC as described by Holling (2001) and panarchy (Gunderson, Holling and Peterson, 2002). The extract was then plotted on the ACC template (Figure 4.3).

This chapter is divided into two parts. In the first part I address Research Question 2. This entails the identification those factors that appeared to act as enablers and barriers to the teaching and learning of the consilience themes in the Unit of Work in the Year 13 French Class at School #1.

In part two, I discuss the limitations of the methodology and the interpretation of the results.

Research Question 2 – Enablers and Barriers

The case study of School #1 revealed three main types of barriers to the teaching and learning of consilience in their French language class. They were:

- a) Students were not given the complete story
- b) There was insufficient clarity in the topic linking devices
- c) Students would not engage in peer interaction in the target language

However, in all instances what was perceived as a barrier turned out to be an enabler because of the creative will of the participants to complete the Unit of Work and their task. In the following passages I explain each barrier/enabler.

a) Students Were Not Given the Complete Story

Two students made the most of a divergent interpretation of the material in the Unit of Work. In the case of L3 and L7 the gaps in information appeared to provide an opportunity for inference. For example, in Lesson 8 (see Chapter 6, Extract 4 e (ii)), L3 and L7 considered that according to the teacher's interpretation of the savannah hypothesis the presence of cities in students' drawings of their ideal landscapes contradicted the hypothesis (see Chapter 6, Lesson 3, Extract 1a). The text, however, provided in the Unit of Work (Appendix 1, Lesson 3) included details about the application of the savannah hypothesis (Orians & Heerwagen, (1992) to city dwellings. An example of this is that of a penthouse apartment that overlooks Central Park in New York as conforming to the criteria of ideal lodgements (see E.O.Wilson, 1998). From the teacher's interpretation the students believed that an ideal landscape meant a dehumanised one. As a consequence, they interpreted the barren landscapes of painters

McCahon and Wong to be expressions of this idealism¹ (Chapter 6, Lesson 8, Extract 4 e (ii)). In fact, L3 and L7 believed that the omission of cities in the paintings was part of a calculated false idealistic image of New Zealand that was echoed by the contestable 100% Pure NZ advertising campaign which showed dehumanised landscapes (Leotta, 2012) (Chapter 6, Lesson 8, Extract 4 e (ii)). As it turns out the students' interpretations of the advertising campaign overlapped with the observations made by Leotta (2012) concerning the focus on empty landscapes in the advertisement.

The Freirean approach of dialogue, Socratic inquiry learning, and integrated learning, where there is mutual learning between the teacher and student (Freire, 1970; Fraser, 2000; Burder et al., 2014) allowed for participants to debate, to critique and to provide their own solutions to problems. In a sense this appeared to give students *carte blanche* to make their own meanings. For example in Lesson 1 students argued in English the validity of the Darwinian interpretation of French medieval courtly love offered in the Unit of Work (Chapter 5, Lesson 1, Extract 11). L4 and L5 expressed intuitive knowledge of feminist arguments for cultural determinism (see also Allen, 2014) citing observations from their experience where it is common for girls to ask out boys (Chapter 5, Lesson 1, Extract 11). L4 decided to remain sceptical concerning the Darwinian interpretation echoing the position of Roughgarden et al., (2006) but not in the same detail (see discussion of Chapter 5, Lesson 1, Extract 11).

b) Making Vertical and Horizontal Connections Explicit

Making connections through thematic integration (Fraser, 2000), using authenticity as the underpinning theme, was successful when authenticity was linked to honesty and genuineness. This was evidenced when two groups of students (L2 and L5, L3 and L7) emphasised what was for them the inauthenticity of the 100% Pure NZ advertising campaign as the central theme of their podcast task project (see Extract 4e (i) and Extract 13 respectively, Appendix 8, and Chapter 6). Authenticity proved to be a natural connecting device when it was not treated as a concept in isolation. For example, the more subtle aspects of authenticity, such as an expression of the desire for order and belonging, were not picked up by students. Students did not pursue the vertical connection of linking authenticity to a

¹ Note that for McCahon the land is naked and bleeding the people and cities are omitted but their presence is felt as the cause of the suffering (see McCahon cited in Brown (1997))

possible epigenetic rule (see E.O.Wilson, 1998; see Figure 4.2) of belonging as detailed in the student readings in Lesson 2 of the Unit of Work (Appendix 1). Both the students and the teacher reported seeing and retaining such links elusive as was reported the post-unit questionnaire results for L4, L5, and L7, as well as in the Teacher-Researcher debrief notes (Appendix 2).

Students attempted to include the widest range of topics covered in the Unit of Work in their podcasts (Chapter 6, Lesson 9, Extract 13 for L2 and L5, Extract 4e for L3 and L7). Students may have attempted this given the focus I had put on making meaningful and coherent links across the topics in the Unit of Work in order to meet consciously the Principle of Coherence of the New Zealand Curriculum (Lesson 6 Tape script). Their behaviour was reminiscent of attempts to include all learning areas in problem solving integrated learning regardless of their relevance (see Fraser, 2000).

The student and teacher reactions were largely consistent with the relevant literature. In particular, Venville et al., (2001), Cross and Gearon (2013) and Fraser (2000) note that a poorly planned integrated learning programme can be demotivating and disengaging for students. Further, improvement could have been achieved through scaffolding the links (see Othman et al., 2015). It is noteworthy that the success the thematic approach to integration is largely dependent on the teacher (Venville et al., 2001; Cross & Gearon, 2013; Fraser, 2000) and given that the teacher found the links tenuous and unconvincing it was perhaps to be expected that the students had difficulty understanding them (Debrief Notes, Teacher-Researcher Appendix 2).

It is possible that student understanding of the interconnections could have been improved if there had been greater emphasis on connections between subjects learnt as “clear and tight” (Cross and Gearon, 2013, p. 56). Caine and Caine (1995) argue as there is a natural tendency for the individual to integrate knowledge it is important for the individual to see how that knowledge fits in within with existing knowledge; this process they call *patterning* (p. 44). By this means, students resist learning knowledge fragments before they can see overall purpose of a learning activity. Students could also benefit from a textbook to support their learning. In this instance students were given series of handouts to support the individual lesson but these were only available either on the day of the lesson, or in advance, if home work was required. In the CLIL context, Cross and Gearon (2013) consider that a folio like

textbook that includes places for reflection would enable students to see the unit “holistically” (p. 54).

Despite this limitation in the methodology, students L4 and L5 reported in their post-unit questionnaires that range of topics covered in the Unit of Work improved their vocabulary and their spoken French. This is consistent with the sense of empowerment that comes with knowing a topic (Cummins, 1994), and also overlaps with findings of CLIL programme trials in Victoria, Australia in which students perceived that their language skills were improving through the programme (see Cross & Gearon, 2013).

The purpose of a thematic approach (that is, horizontal analysis) was three fold. First, to demonstrate to the case study participants the underpinning mechanism to connect topic and language areas to meet the requirements of assessment. Second, to show a means to bring about E.O.Wilson’s, (1998) notion of the unity of knowledge horizontally through the sharing of unifying patterns or ideas found across disparate topics; that is, to allude to E.O.Wilson’s (2012) notion of congruence. Third, the assertion of the notion of interconnectedness and interrelatedness of all things. This includes that the learner is part of a greater whole and in so doing express the spiritual (Palmer, 2003), the human spirit (Somerville, 2008) and the desire for communion (E.O. Wilson, 1998). That is, to put forward the notion that they are more than their individual egos (Fraser, 2014).

The problem posing approach proved more successful than the thematic approach (Venville et al., 2001; Fraser, 2000). This is due in part because the problem posing approach is inherently open and therefore there is a greater possibility of negotiation with the teacher, which encourages a sense of ownership of learning (Fraser, 2000). The findings of this investigation resonate with Fraser’s point.

Students were able to make coherent links with a variety of topics when challenged to communicate an issue of their choice to the international French public in the form of a podcast that they knew would be considered for publication on a website with a large French audience. In spite of the lack of clear links between topics, their podcasts involved innovative linking and achieved a degree of interdisciplinary coherence.

This was evident in L4’s song (Chapter 5, Lesson 11, Extract 24). L4 connected her religious beliefs to valuing animals as moral exemplars for love, and a community ecological restoration of a community project. In the development of her song she considered the

evolutionary arguments for human courtship and dealt with them by distancing herself from them and instead focusing on the spiritual inspiration she could draw from animals. Through her song L4 appeared to express the spiritual through the discovery of a way into an appreciation of nature through the premodern world view of nature, as an expression of the mind of God. She appeared to latch on to the idea that animals had value in so far as they were sexual moral exemplars (see Chapter 6.1). In this way, she achieves the spiritual by connecting herself and her beliefs to the natural world and the lives of animals.

L5 reported that she most enjoyed discussions from podcast preparation suggesting a willingness to communicate (Kang, 2005) but unfortunately students did not have sufficient language skills to undertake this in French (the target language). The podcast L5 produced, along with her partner L2, and her classmates L3 and L7, denounced the inauthenticity of the 100% Pure New Zealand advertisement. They undertook this task despite the apparent initial reservations of the teacher in Lesson 3 (Extract 9), and in spite L3 and L7's own reservations about being critical of their country (Lesson 7). In this instance the teacher encouraged L3 and L7 in the interests of honesty to pursue their project in spite of their apprehensions. It is noteworthy that a year after the students undertook their podcasts in 2011 that Dr Mike Joy (Massey University scientist) was accused of being "a traitor" (Galtry, 2013 p. 83) in the New Zealand media after reporting the poor state of the New Zealand environment in an interview with the *New York Times* November 17, 2012 (Galtry, 2013). It is possible that the students could have run the risk of attracting negative attention and accusations. Incidentally, the website *Frogs in NZ* did not publish the podcasts that were submitted to them. The podcast of L3 and L7 was not submitted for publication on the teacher's recommendation citing reasons of quality (see Chapter 6).

It is arguable that L5, L3, and L7 were expressing a desire to contribute to the public welfare and putting themselves at risk of media attention by blowing the whistle on the advertising campaign. This social action could be seen as an expression of the spiritual (see Palmer, 2003; Fraser, 2014).

c) Peer Interactions in the Target Language and Fluency

L5 developed the kernel of her idea that the McCahon landscapes are "plain" and encountered "all the time" in New Zealand in the target language of French in dialogue with her peers in English (Chapter 6, Lesson 3, Extract 2, Appendix 8), and with the teacher in

French (Chapter 6, Lesson 3, Extracts 3-4d, Figure 6.1). L4 developed her idea «*la Nature est vivante* » (Nature is alive!) through the translation of French texts into English, with the aid of her classmates and the teacher (Chapter 5, Lesson 1, Extracts 9-14, Figure 5.1).

In regards to student handling of unfamiliar topics, it is possible that the students in this case study had not progressed much beyond what DeKeyser cited in Ellis (2005) calls “language-like-behaviour” (p.4). In other words, students had not attained the required level of automatism, or “implicit knowledge” (Ellis, 2005 p.14) necessary for coherent and meaningful discussion in the target language. Instead, it appears that the students’ French was mainly “explicit knowledge” (Ellis, 2005 p.14).

The ability to comprehend and communicate in the target language helped L5 in her learning of a theme that used consilience as a learning tool.

Even so, the unwillingness of the students to engage in peer interaction or dialogue to complete opinion gap tasks, or to discuss unfamiliar ideas in the target language did not prevent the integration of ideas, and the acquisition of vocabulary, as is indicated by the post-unit questionnaires and the student production of their podcasts in French.

This unwillingness to interact in French with one another negated the potential for acquiring language through authentic discussions in the target language which forms the central element in the Nature, Art and Language Unit of Work (Genet, 2010) - a scheme based on Krashen (2004, 2011), and the role of the central strand of communication in the Learning Languages Learning area of the Proficiency Descriptor of the NZC (2007).

Through the Unit of Work students were invited to engage in unscripted, spontaneous discussion of an unfamiliar topic in the target language. The turn-by-turn analysis of the first few minutes of Lesson 1 (Chapter 5, Extract 1) revealed that students may have been placed in a situation resembling a double bind (Bateson, 1972). That is, whatever action they took: to speak French, or to speak English, or to refuse to speak, was the wrong one. Under the ethical agreement (see Chapter 4) the participants had the freedom to exit the research project without explanation or to continue with it. Rather than exiting the programme the participants continued until the completion of their French podcast task using their translation skills and English to negotiate meaning from the French input, and then translate those meaning into French. From the analysis of Extract 1 in Lesson 1 it is possible that students and the teacher were aware of the double bind. This awareness may have been exhibited in behaviour such as

teasing, irony, and sarcasm on the part of the students to manifest their disapproval at being asked to perform a task that that did not have the linguistic resources to undertake (see Chapter 5, Discussion of Extract 1).

For Cross and Gearon (2013) “the start point” (p. 50) of a CLIL based lesson is higher level engagement and understanding. Students are not obliged to discuss in the target language, they are at liberty to use any language at their disposal to make meaning. However, Cross and Gearon (2013) urge that use of the students’ first language is acceptable in these situations only if it is used in response to input in the target language. In the case studies of L4 and L5 their discussions with their peers were indeed in response to texts and mini-lectures given in French both by the teacher and myself when I was invited to teach the class

For the teacher, to expect the students to be able to engage in peer to peer or small group dialogue of the topics in the Unit of Work as they were invited to do, was unrealistic in regard to the limited number of contact hours the students in the New Zealand school system have with languages. At the time of the beginning of the Unit of Work L4 and L5 had received in around 656 and 719 hours contact teaching hours of French, respectively, at School #1. Lightbrown (cited in Larsen-Freeman, 1991) conservatively estimated that for a young learner to *acquire* their first foreign language can take between 12,000-15,000 hours. Lightbrown continues and points out that learning a language is a very gradual and incremental process that requires a great deal of repetition and in light of this Larsen-Freeman (1991), not unlike the teacher at School #1, notes that it is necessary for stakeholders in language teaching to take a common sense approach in setting achievement expectations. These views are in accord with East (2014), Harvey (personal Communication, 2015), and Yogeewaran and Leschi (2015).

The demands of the Unit of Work were predicated on my interpretation of the NZC Proficiency Descriptor and centred on the use of the word *language*. As discussed in Chapter 1, the Proficiency Descriptor in the NZC for Learning Languages does not clearly specify that communication during discussion and exchange of idea, and should be in the target language, and the use of the word language should be interpreted in reference to the NZC in its entirety (Benge, F. personal communication, 9/6/2015). If language is taken to mean any language not necessarily the target language then the position of the teacher is defensible (see Chapter 1). But, the use of the students’ native language in a language classroom is controversial (Mori,

2004). The classroom policy of target language only is widely believed to be an effective means to promote language acquisition (Mori, 2004).

It is arguable that in the painstaking process translation, discussion of meaning, composition of a text in English and /or French writing, rehearsal and final presentation in the service of the integrated learning task of writing a podcast provided opportunities for revision and “translanguaging”. Revision is the rethinking of concepts to make and re-make meaning. *Translanguaging* is the use of the learner’s first language to support and enhance understanding of the target language not to usurp it. Even so, students should not become overly reliant on their first language to make meaning. Over reliance on the first language tends to dissipate the benefits of CLIL (see Cross & Gearon, 2013, pp. 53-54). Students used English whenever they worked in small groups and very seldom attempted to speak French together to discuss the topics².

According to comments made by the teacher at School #1 with regards the class level of French, the students were dependent on English to make meaning because they did not have sufficient training to engage in spontaneous discussions on the unfamiliar topics in the Unit of Work. This may be a result of the tension that exists in New Zealand context between favouring the teaching of languages for accuracy in order to meet high stakes assessment demands, and teaching for fluency. It is a key belief that communication is “impoverished” if grammatical accuracy is weak’ (East, 2012, p. 178). East’s (2012) study revealed that teachers in New Zealand consider the *New Zealand Curriculum Framework* and assessment regime have led to a teacher-centred and “form-focused approaches” (p. 46) which act as impediments to student retention the viability of language courses. New Zealand teachers in East’s study consider curriculum reform would provide opportunities for a more experiential learning approach. East (2012) endorsed the TBLT as a means to achieve this renewal.

With this in mind the Unit of Work could have been preceded with an immersion training period of, for example, two weeks to build confidence in students (see Cross & Gearon, 2013). If the issue of fluency discussed above is framed in terms of the careful use of the CLIL approach then the student use of English to deliberate is not a barrier to the teaching of consilience. It is in fact an advantage.

² There is one exchange in French between L1 and L5 in Lesson 11. Both students had completed an exchange in France and were able to converse colloquially.

Research Question 3a – Evaluation of the Theoretical Framework

3a) To What Extent Can the Learning Experience Be Described Using Panarchy as a Theoretic Framework?

“...[P]anarchy is a tautology of birth, growth, maturation, death, and renewal...”, and any adaptive and evolving living system will conform to this model (Gunderson et al., 2002 Kindle location 6447). Human beings are in a state of becoming (Sartre, 1943). Not unlike all living things, humans are constantly adapting themselves to an ever changing world. Adaptation can be thought of as learning (Bateson, 1972). Piaget, (1950) remarked the strong overlap between the processes of biological evolution and the processes of learning. The state of constant adaptation and becoming is exemplified in the notion of the experiential learning cycle of Kolb and Kolb (2009). This notion is integral to the learning philosophy contained in the *NZC* (Kolb & Kolb, 2009).

Briefly, in this next section I show how the ACC may be aligned with the experiential learning cycle of Kolb and Kolb (2009). I do this so as to demonstrate that the ACC has the potential act as a means to achieve congruence with experiential learning theory.

The Experiential Learning Cycle was based on William James’ philosophy of “radical empiricism” where everything is experience whether it is thought or pure external experience (Kolb & Kolb, 2009). Experiential learning can occur as much in a lecture theatre as in a constructivist student-centred classroom as in the outdoors (see Kolb & Kolb, 2009). This also means that learning will occur at all stages in the cycle. This overlaps with the conception of micro-learning events of the ACC that can occur anywhere on the cycle as described in Chapter 3, and in Chapters 5 and Chapter 6.

The experiential learning cycle is made up of four stages (Figure 7.1). In describing it I begin with Concrete (pure) Experience (CE) which is the basis of knowledge formation (Illeris, 2009). The pure experience is reproduced through “retrospection” (recollection) or Reflective Observation (RO). This may lead to the formation of abstract concepts (AC) and generalisations. In other words the CE is understood or grasped. This concept is evaluated. It may be accepted or rejected. If accepted this leads to a phase of thought whereby the new concept is trialled for potential use in new situations, a phase referred to as Active

Experimentation (AE). At this stage we can say that the experience has been transformed into knowledge. This period of trialling may lead to the generation of new experiences (CE).

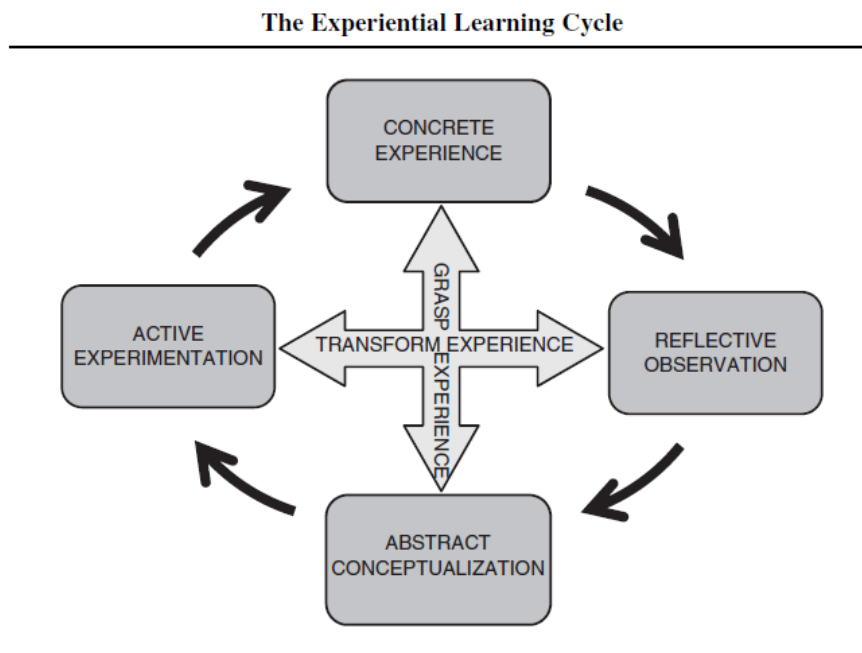


Figure 7.1 Kolb and Kolb's (2009) experiential learning cycle.

The data from both L4 and L5 could be reinterpreted using the experiential learning terminology (Figure 7.2). For example, in Lesson 3 the Concrete Experience (CE) for L5 could represent the series of three disturbances at K related to the savannah hypothesis, the starkness of contemporary New Zealand landscape painting and the teacher's question as to where in New Zealand are these landscapes found (Extracts 1-3, Figure 6.1; Figure 7.2). L5's joke and the class laughter signalled that L5 had transitioned to the reorganisation phase (α) and reflection which may overlap with Reflective Observation (RO) (Figure 6.1, Figure 7.2). The teacher questioned L5's joke about the ubiquity of "boring" New Zealand landscapes (Extract 4b, Figure 6.1, Appendix 8). L5's idea about the landscapes appeared to crystallise with the showing of the 100% Pure NZ advertisement juxtaposed with the challenge to its validity given the levels of environmental degradation in New Zealand. L5 then asked the teacher "How do you say awkward in French?" (Figure 6.1, Extracts 8a-c). This moment could pertain to the formation of the Abstract Concept (AC) (Figure 7.2). The experiential learning cycle predicts that Active Experimentation (AE) should occur. Of note is that L5 began to attempt jokes in French mocking the exaggerated claims in the advertisement. She

attempted the joke first in French, but when that received no response she attempted the joke in English, with a positive response from only L2. These attempted jokes appear to overlap with Active Experimentation (AE). Despite the lack of response from the other students L5 made the issue of inauthenticity in the 100% Pure NZ advertisement the central idea of their podcast which was performed at the next conservation (K) phase; that is, L5 transferred the concept to the integrated learning task that became a Concrete Experience.

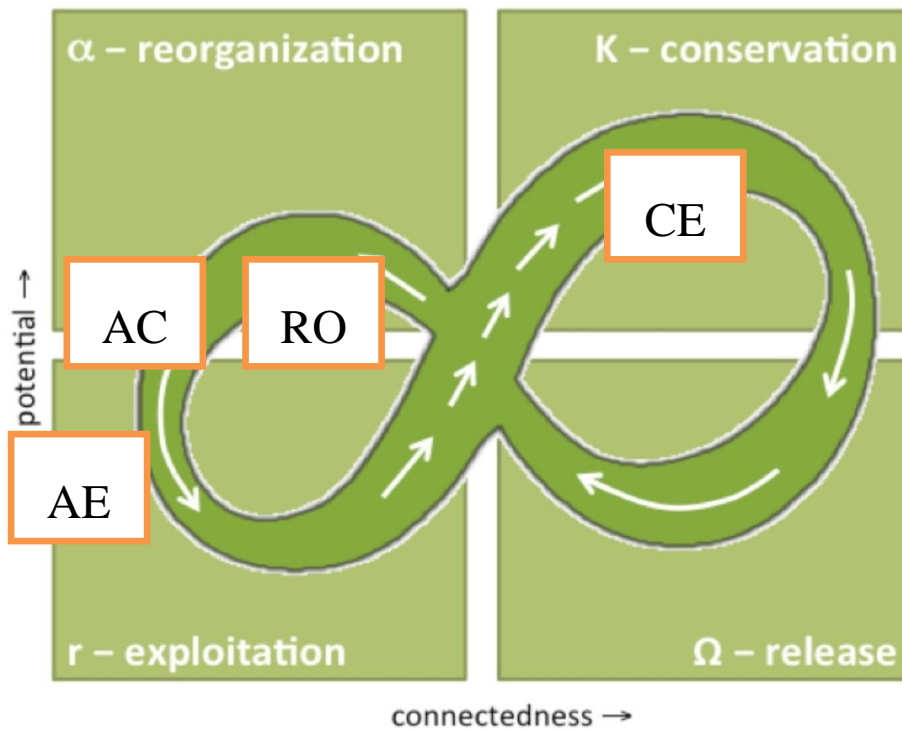


Figure 7.2 Parallels between the ACC and the phases of Kolb and Kolb’s 2009 experiential learning cycle for student L5 in Lesson 3.

What is lacking from the panarchy model for learning that I developed are explicit parallels to the *grasp experience* and *transform experience* of the experiential learning model (Figure 7.1). Grasp experience represents the understanding of the experience by the learner, and transform experience is the conversion of that experience into knowledge. The parallels to these two processes are implicit in the ACC and found in the transition between reorganisation (α) and the exploitation (r) phases. At (α) L5 grasps the pretension of the advertisement and responds with laughter. At the cusp of (α) and (r) she transforms her reflection of the concrete event into experimental jokes through active experimentation.

The Ministry of Education have restated the four phases of the experiential learning cycle as a spiral made up of phase of experience, reflection, generalising and abstracting, followed by transfer. (MoE, 2004) The alignment is elaborated below (Figure 7.3)

- Experience – the engaging demonstration of a concept ($K \rightarrow \Omega$).
- Reflection – where the learner questions and reviews what they have experienced or done. Here students develop critical thinking skills ($\Omega \rightarrow \alpha$)
- Generalising and abstracting – reflects on the answers to the questions posed during the reflection phase and tries to make sense of answers connecting them to together parts of their experience. Learners speculate and hypothesize on what would happen if they transferred the experience to other areas in their lives. ($\alpha \rightarrow r$)
- Transfer – the learner applies the concepts to the coming activity or to their lives. Students after which ask the question *now what?* This question prepares the learner to anticipate the next experiential learning event, and the cycle begins again but at a higher level, building on the previous learning experience ($r \rightarrow K$) (Figure 7.3).
- Connections between spirals – the teacher points out the connections between learning areas at the transfer point (TKI, 2004).

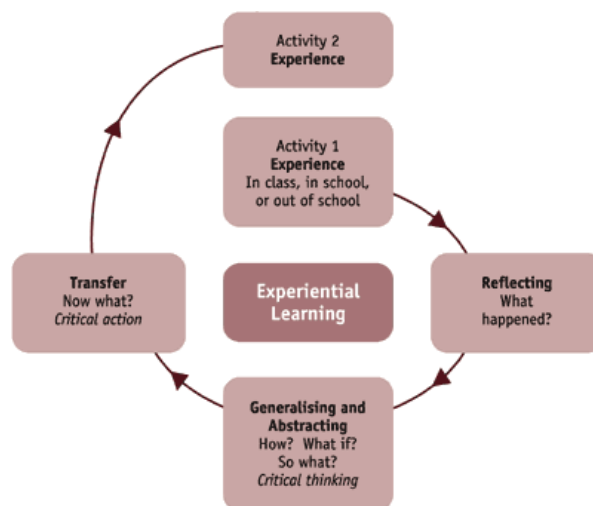


Figure 7.3 The experiential learning spiral (TKI, 2004 adapted from Henton, 1996)

The differences between panarchy for learning and the experiential learning cycle are that the responses of the learner to CE need to be considered holistically and terms of three dimensions of the ACC: potential, connectedness, and resilience. In addition, the experiential learning spiral suggests that transitioning between the phases is even and smooth. The ACC teaches us that transitioning is variable (Holling, 2001; Gunderson et al., 2002). The shift

from K to Ω is abrupt, and the shift to α is rapid. The system slows down over α to r and speeds up again as the system leaves r and slows again toward K. For example, L5 transitioned from the disturbance events (i.e. CE) at conservation (K_1) through collapse (Ω) to reorganisation (α) (i.e. AC) in 72 seconds (Chapter 6, Extracts 3-5, Appendix 8 and Figures 6.1, 7.2). However, she moved from exploitation (r) (AE) to conservation K_2 (i.e. CE₂) over a period of 64 days (Extracts 9-13, Appendix 8 and Figures 6.1, 7.2).

In Henton's (1996) model the teacher makes connections between learning spirals at the transfer phase. In the panarchy such connections could constitute input in the form of ecological remember to guide the transition from reorganisation to exploitation and thus influence the trajectory of student learning (see Figure 3.2). Henton's (1996) spiral, however, does not include the spread of ideas through the process of revolt (Figure 3.2). The overall advantage in using the ACC to interpret learning are that it raises awareness of the holistic and nested nature of the learning system and the interconnectedness of experience through ecological remember and revolt.

Panarchy and Transformational Learning Process after Stanger et al. (2013)

Stanger et al. (2013) used panarchy to describe the transformational learning process. They adaptive the ACC model for teaching and learning. Stanger et al. (2013) charted qualitatively student perceptions of their transformational learning process onto a blank adaptive change cycle per student.

An important insight of Stanger et al. (2013) is that students are seen as being able to enter the cycle at any stage. Furthermore, students may progress very slowly if at all through the stages.

There are differences in interpretation of panarchy for teaching and learning from the one presented in this thesis. I discuss briefly the major points of departure from my use of panarchy. To begin with, Stanger et al. (2013) interpreted the y-axis representing potential for change or the storage of fuel in a forest ecosystem as "eco-socio-spiritual capacity" (p. 94). By this they appear to mean growth in a way to perceive Nature, society, and the spiritual as interconnected; that is, a progression toward spiritual and ecological enlightenment and transcendence. In this way, the generic notion of potential has been given specific meaning to match the goal of the teaching program in which the participants were involved. For example,

in the adaptive cycle chart for participant D19, the student appears to be increasing in eco-socio-capacity exponentially, and then leaves the cycle at the maximum point in the conservation phase which is interpreted as a kind of revolt to another cycle. This could be seen as problematic in terms of the nature of the adaptive change cycle. Firstly, the exponential growth from r to K would suggest that she is also increasing geometrically in connectedness. This would mean that at the same time she is losing proportionally resilience and thus is becoming increasingly brittle and susceptible to collapse. However, in the description, Stanger et al. (2013) claim that D19 is in fact leaving the adaptive change cycle from K to begin another higher cycle through revolt: “Thus, she moved through the growth phase of the loop and ‘revolted’ to another loop” (p. 106).

Revolt usually occurs as a result of collapse/release ($K \rightarrow \Omega$) that reverberates upwards to a slower, larger adaptive change cycle in the panarchy (Holling, 2001). Although there is communication between nested adaptive change cycles in a panarchy, it would go be unusual for the system to move to another attractor from the summit of the front loop of maximum conservation which Stanger et al. (2013) suggest. Shifting to other attractors occurs in the back loop between re-organisation and exploitation (Holling, 2001). Normally, in order for the student to transcend her current state of enlightenment would, according to ACC model, have to undergo a collapse and re-organisation. She can attain another state of mind that is being drawn away to another attractor at the peak of the back loop which is what happens in ecosystems. To encompass the notion of ongoing spiritual growth which Stanger et al. (2013) undertake to express through the ACC, I think it is important to restate that the adaptive change cycle might be better conceived as a spiral (see Figure 7.4 below).

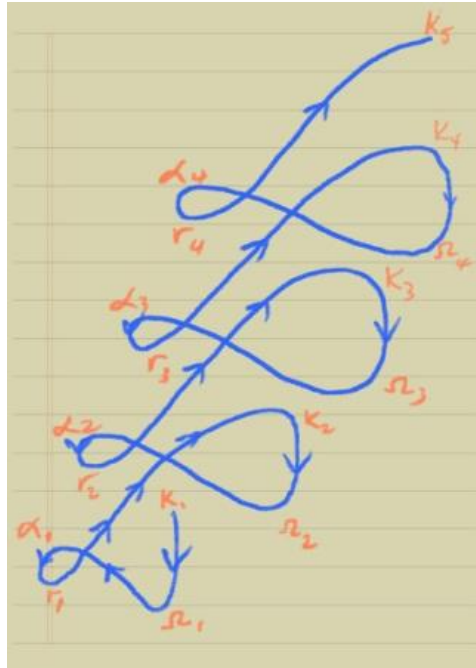


Figure 7.4 The ACC as an iterated spiral. The system enters a renewed state from exploitation (r_2) to conservation (K_2) without the deviation to another attractor.

In this way the ACC can be seen as overlapping combined with Henton's (1996) conception of learning used by the New Zealand Ministry of Education (see MoE, 2008) and symbolised as a nautilus spiral (MoE, 2007). In the inside cover of *The New Zealand Curriculum* the MoE (2007) cites Wendell Holmes who considered the nautilus as an apt "symbol of intellectual and growth". New ideas cause irreversible change the individual's mind, so that, "[o]ne's mind, once stretched by a new idea, never regains its original dimensions".

Evaluation of the Metaphor

For Gunderson et al., (2002) the interest in using panarchy to interpret socioecological systems is perhaps not so much to see where they conform to the metaphor but where they diverge from it. In the following section I discuss the extent to which the theoretical framework could be used to interpret the data. I conclude that because the metaphor is workable, the next steps could be towards its refinement, and to use it for learning in other settings.

Bailer-Jones (2002) argues that in the development of a metaphor, negative analogies are as much a part of the metaphor as positive analogies; that is, aspects of a metaphor that do not conform to empirical evidence are as important as those aspects that do match reality. In this

investigation I identified every element at my disposal related to the formation of two students' ideas. I analysed each element and considered it in terms of the ACC and panarchy as an ecological metaphor for the teaching and learning process. The results show that every one of the relevant elements in the development of the student's idea could be meaningfully and coherently plotted on the ACC template (Figures 4.3, 5.1 and 6.2). This demonstrates that these two students' learning could be spoken of, and thought about, consistently and coherently using a new vocabulary of adaptive change and panarchy. From the analysis it appears there are no obvious negative analogies in the data set, which suggests that it is highly likely that the pattern of L4's and L5's idea development may be interpreted confidently through the metaphor of ecosystem change.

With this confidence the developed metaphor as a methodology could be further refined and trialled on other instances of idea development in other teaching and learning settings.

Methodological Limitations

Limitations of Data Collection and Analysis

There is a risk of projecting meaning onto the data that conforms to researcher expectations (Merriam, 1998), and this was a danger because I came to the data with a predefined model of the ACC and panarchy. To mitigate this potential tension, I was mindful of the value in finding places where the panarchy metaphor did not apply (Gunderson et al., 2002) but rather, this could be achieved most effectively by letting the data speak for itself.

Further, to reduce subjective interpretation of participant behaviour and talk I turned to universal rules of human interaction to render interpretation more objective and replicable. These include the rules of: adjacency pairs, Grice's (1975) conversational maxims – an utterance requires a response, reciprocity, ingratiation, turn-taking, social dilemmas and so on. On the basis of these rules I considered my claims about participant behaviour to be the most likely explanations for the behaviours. The claims were limited by my interpretations and the explanatory power of these models of human behaviour. The claims were also limited by the data available to me. As a result, I am open to alternative interpretations predicated on additional evidence that may serve to undercut the evidence.

Limitations of Conversation Analysis Transcription Conventions

The transcripts remain only approximations of the recorded texts (ten Have, 1990). The recordings themselves fail to pick up all utterances and the recordings are themselves approximations of what was said (ten Have, 1990) because of the limitations of the recording devices. Still further there remains doubt between the participants of the precise meaning of their respective utterances.

There are a number of instances where students did not wish to be overheard. In these cases they whispered. The digital recorders were seldom sensitive enough to capture the interaction over the noise of the classroom, but wherever whispers were discernible they were transcribed.

CA is not only very time consuming (Goodwin & Heritage, 1990), but CA transcription notation requires practice to use and to interpret (ten Have, 1990). It is the focus of CA that the audio-recordings and their transcription are the primary sources of data (ten Have, 1990; Markee, 1994), if not the only source of evidence (Mori, 2004). It is advisable that transcripts are made by the researcher who will use them (ten Have, 1990). The objective of the transcript is to show what was said and how it was said (ten Have, 1990). Transcripts are included in the body of a research text so that the reader can verify that the researcher's interpretation (Mori, 2004). The presentation of the transcription data required to complete the ACC template (Figures 4.3) occupies considerable space in Chapter 5. It was necessary to create an appendix for the extracts in Chapter 6 so as to preserve space for insights and other important research components.

Audio Recordings – No Visual Data

The teacher did not wish the lesson to be videotaped. Difficulty in audio recordings arose when trying to distinguish ownership of non-verbal utterances such as laughter and body language. In my initial listening to lesson 3 I thought L5's joke elicited laughter from all the students in the class. Closer and further examination revealed that laughter probably came mainly from L5 herself as well as L2 who was her class work partner and friend. Apart from this instance it was also sometimes difficult to know who is speaking when a student spoke French.

The aforementioned limitation could have been mitigated through triangulation of added data sources. In this respect I concede that much could have been gained from interviewing students in spite of the limitations discussed in detail in Chapter 4. Further, it was unfortunate that students did not accept the invitation to submit their learning journals. Much could have been gained in increasing the internal reliability of the results. With these limitations in mind I undertook to analyse the data in extreme detail in order to provide compensation.

Summary

Enablers and Barriers

The second research question sought to identify the enablers and barrier to the teaching of consilience in a senior French class and I concluded that each perceived barrier may constitute an enabler. The identified barriers to the leaning of consilience were 1) non-exhaustive information given to students, and divergent interpretations of that information; 2) thematic versus task-based integrated learning; 3) unwillingness to interact with each other in the target language.

In instances where there was insufficient information given to students, they were able to create coherent arguments that were paralleled by the relevant research literature. In a situation where the students had misunderstood and where the teacher's interpretation of material diverged from the provided text this proved to be a source of innovation and insight for students.

Overall, students were able to integrate knowledge thematically through the podcast task. However, the participants expressed difficulty in seeing and articulating the thematic connection of authenticity. The experience of the students is consistent Venville et al., (2001) and Fraser (2000).

The fact that students did not interact in French largely negated the possibility of students acquiring the target language through small group discussions in the target language, but this did not prevent students from completing the podcast task in French. For example, ideas were negotiated by and large in English amongst themselves. These ideas were then translated into French through negotiation with each other, with the aid of a dictionary and the teacher. L5, however, formed her position on the authenticity of the 100% Pure NZ advertising campaign

largely through dialogue with her teacher in French in class in Lesson 3. Through her podcast L5 attempted to publicly denounce to the French public in the target language the discrepancy between the images of New Zealand projected in the 100% Pure New Zealand advertisement and the actual state of the environment. She promoted the Quail Island Ecological Restoration Project as a step towards a repair of the environment. This project gave her a sense of restored personal national pride that had been damaged by the advertisement. L3 and L7 also articulated similar views to those of L2 and L5 in their podcasts and expressed concerns about being publicly critical of New Zealand. Through her podcast L5 engaged in what is arguably prosocial action, stimulated through the input from the Unit of Work. That is, L5's podcast could be interpreted as what Mezirow would call a "moment of social responsibility" (Mezirow cited in Illeris, 2002, p. 58). In contrast, L5 did not indicate in her post-unit questionnaire that she experienced such a moment. Instead she stated that her views regarding courtly love were revised.

Similarly, through her French song L4 promoted the conservation of animals through the premodern medieval view of Nature as conveying moral guidance for love to humanity. For L4, this view enlivened Nature; a view that she promoted actively during class through her song in French. As with L5, L4 did not state that her views had been changed or that she rethought her views during the Unit of Work. It is difficult to reconcile this discrepancy between the interpretation of the evidence from audio recordings and transcripts with the students' statements in their questionnaires. I attempted to explain this by commenting that L4 decided that the content was not new and that she may have rethought her reaction to it. In Chapter 6 I argued that L5's observed transformational experience was not so much that she discovered something new, as that she was aware already that the New Zealand landscapes clashed with image projected overseas, but that she gained the input and confidence to act on what she knew already and articulate this in her podcast. Nevertheless, the discrepancies between the classroom data and the post-unit questionnaire data could have been resolved by a follow-up interview. The research intervention occurred over the Canterbury earthquake series. The data collection was interrupted by a major seismic event in June 2011 which led to the cancellation of the field trip to Quail Island. The school suffered severe structural damage. No follow up interviews were considered owing to the likely earthquake stresses in the students and added loss of teaching time. Notwithstanding, this discrepancy in the data set the transcript data for two students could be coherently interpreted using the panarchy metaphor. There did not appear to be any negative analogies; that is, data that could not be

interpreted using the metaphor. This suggests that the theoretical framework could be trialled in other settings.

It was acknowledged much could have been gained from conducting interviews notably to provide added sources of data for triangulation and increase reliability. This would have been useful particularly in regard the students' decision to withhold their learning journals. Further, it is also acknowledged that the transcripts are approximations of the audio recordings, and the precise meaning of their respective utterances may never be known. However, I have attempted through extreme detail and repeated listening the audio data and reading of transcripts to see patterns that I could match to existing theory and make inferences to interpret the data.

Evaluation of the ACC of Learning in Comparison to the Experiential Learning Cycle

The experiential learning cycle was outlined and compared to the ACC using the example of L5's experience in Lesson 3 of New Zealand landscapes in relation to New Zealand landscape art and a critique of the hyperbolic advertising campaign of 100% Pure New Zealand. The two models appear to complement and enlighten one another. The ACC has the advantage of being multidimensional, interconnected, and holistic. The experiential learning model has the advantage of its simplicity. The experiential learning cycle has been reworked as a growing learning spiral for the NZC (MoE, 2004) following Henton (1996). The spiral implies smooth and even transitions between phases. The spirals are connected at the transfer phase with the aid of a teacher. This overlaps with ecological remember or with input from a teacher or text in the panarchy model.

In this section I briefly compared Stanger et al.'s (2013) use of panarchy as a means to chart student transformational learning. They propose that that a student may enter the ACC at any point and progress at varying rates or not at all. Stanger et al. (2013) consider that the learner may exit the cycle at any stage, and they give the example of a student exiting at the front loop to a higher level of social, ecological and spiritual thinking. However, a system will usually shift to another state; that is to another attractor, from the back loop after the re-organisation phase (Holling, 2001, Figure 3.1). I proposed that ongoing mental and spiritual growth can be conceived of as a series of ACCs in the form of an upward spiral (Figure 7.4).

Every utterance relevant to the development of L4 and L5's key ideas was presented as an extract from the tape scripts. Each extract was thought of in terms of its place on the ACC template within the panarchy of the classroom setting. Each extract was coherently placed onto the template with respect to the three dimensions of the model. There were no extracts that could not be considered and plotted in this manner; there were no negative analogies.

Limitations

I analysed the data with the view that it should speak for itself. I then took this interpretation and considered it in terms of the panarchy metaphor. However, I was aware that I was coming to the data with a set of expectations to see it in terms of the models I was using to interpret the data. To counter this potential bias I tried to find examples that could not be interpreted through the metaphor.

The students were conscious of the digital recorders. At times students L2 and L5 moved out of range of the recorders and there are also occasions where these same students whispered and so their utterances could not be captured. With no visual data audio recordings were the primary source of data. This meant that non-verbal utterances such as body language could not be included. In this regard the data set is incomplete.

In the following chapter I address Research Question 3b. I detail the insights gained from the experience of interpreting the learning process as an ecological panarchy, and from wider reading. These insights constitute a possible foundation of a way in which the theoretical framework could be further refined and developed to gain understanding about the learning process.

CHAPTER 8

INSIGHTS

RESEARCH QUESTION 3B

The river was there. It swirled against the log piles of the bridge. Nick looked down into the clear, brown water, coloured from the pebbly bottom, and watched the trout keeping themselves steady in the current with wavering fins. As he watched them they changed their positions by quick angles only to hold steady in the fast water again. Nick watched them a long time.

Big Two-Hearted River – Ernest Hemingway (1922)

Research Questions 3b

From the application of the theoretical framework, what insights can be gained for the refinement of the theoretical framework and understanding about the learning process?

I have been developing a metaphor of the process of teaching and learning as akin to the recovery of fire prone forests through Holling's (2001) notion of the adaptive change cycle (ACC) and Gunderson et al., (2002) and Gunderson and Holling's (2013) notion of panarchy. This ecological metaphor serves as an underpinning for the structure of learning process. In

this way the metaphor may be considered as an approach to consilience in the form of Wilson's (2012) congruence between ecology and the teaching and learning process.

What follows are directions for deeper understandings and refinement of the panarchy of learning metaphor. In exploring these directions, novel insights emerge regarding the nature of the development of ideas and consequently the need to make *The New Zealand Curriculum* (the NZC) coherent in relation to them.

In section 1, I examine Kay's (1999) contribution to panarchy and render it parallel to the teaching and learning metaphor thus far developed. Kay (1999) aligns panarchy to energy and information flows and self-organisation that are predicated on the non-equilibrium thermodynamic theory of Prigogine (1980), Prigogine and Stengers (1984), and also on the work of Koestler (1978). Koestler worked on the notion of the universality of hierarchic organisations of complex self-organising systems and the concept of the *holon* as an entity that is both a part and a whole of a system. Of interest is that Prigogine's model has been a source of metaphors to describe learner transformation (see Doll, 1986; Karpiak, 2000; Gilstrap, 2007). Mindful of existing educational analogies, I seek connections between teaching and learning and Kay's (1999) study of energy flows on system development.

In section 2 of this chapter I consider the learning theory of constructivism in relation to the panarchy metaphor of learning thus far developed. I focus on Conner's (2014) evaluative constructivism. This involves the student filtering that which they wish to learn based on the teacher guided awareness of the student learning capacities. I propose that this kind of negotiation of learning from self-awareness can be thought of, metaphorically, as an ecological filter whereby the direction a post-disturbance recovering ecosystem takes is determined by the various biotic and abiotic qualities on the ground and in the air (Hobbs & Norton, 1996). The success of Conner's (2014) evaluative constructivism depends on the willingness of the students to participate; in other words, their levels of mental openness and flexibility. These qualities appear to have overlap with competencies for lifelong learning promoted in the NZC.

In section 3, I seek metaphorical alignment with the three dimensions of the ACC and the Key Competencies in the NZC.

Self-Organising Holarchic Open Systems (SOHOs) after Kay (1999)

The second law of thermodynamics states that the universe is winding down to disorder; that is, it is heading towards thermodynamic equilibrium where there are no energy gradients and therefore no flow of materials or energy (Prigogine & Stengers, 1997; Kay, 1999). In other words, the universe is winding down to a state of high entropy or disorder. This definition poses a problem because it cannot account for Darwinian theories on the evolution of life in which, in general, simple organisms become complex and exist a long way from thermodynamic equilibrium in a state of very low entropy (Schrödinger, 1944; Lovelock, 1979; Ulanowicz, 1997; Kay, 1999). It was Schrödinger (1944) who first resolved the paradox between the second law of thermodynamics and evolution by natural selection (Kay, 1999). He saw life forms as the dissipaters of energy. That is, organisms temporarily develop and maintain internal order or low entropy conditions by exploiting energy while, at the same time, excreting wastes or high entropy materials and energy to the outside (Doll, 1986). In the overall scheme of things the energy budget of the universe is not compromised, but only temporarily suspended where life and other open systems exist (Kay, 1999).

Ecosystems are open systems. They take in flows of energy, material and information (in the form of species) and use these flows to make and maintain structure; that is, to self-organise (Prigogine, 1980; Kay, 1999). The formation and the maintenance of such structures dissipate the incoming flow of energy. The form of the structure takes is referred to as “the dissipative structure”, and the function of the structure, or what it does, is “the dissipative process” (Prigogine cited in Kay, 1999 p. 4). In principle, the more structure that spontaneously arises, the more energy that is dissipated. A complicated living system contains a great deal of order and is consequently a long way from thermodynamic equilibrium. A synonym for thermodynamic equilibrium for a living system is death (Kay, 1999).

In the following passages I detail aspects of Kay’s SOHO systems, drawing metaphors to add to the theoretical framework for teaching and learning (refer to Table 8.1 for a summary of SOHO terms and the proposed metaphorical counterparts in teaching and learning).

Table 8.1 Summary of SOHO terms and the proposed metaphorical counterparts in teaching and learning.

SOHO concept	Ecological definition	Metaphor in teaching and learning
Conservativism	Systems resist being shifted from equilibrium and their current state	Individuals resist change. This could be expressed as nostalgia, peer group allegiances, a desire for belonging and the authentic (Sedikides, Wildschut, Arndt & Routledge, 2008).
Attractor	Ecological template for a specific ecosystem	A world view that has an epigenetic foundation
Domain	Range of resistance before a system collapses or shifts to another attractor	The student comfort zone - in this zone students develop through Piagetian assimilation
State space	The range of attractors or ecological templates where an ecosystem may shift after disturbance	The range of possible alternative belief systems or attract draw students after disturbance
Role of the researcher	To scope out alternative ecosystem attractors	To scope out the range of alternative attractors or epigenetically based world views for students
Dissipative structure	An open system, such as a cell, an organism that takes in and uses exergy, materials and information to build structures and processes that dissipate the incoming flow of exergy	An idea, a schema, a neural network
Lower flows threshold	Insufficient flows for a system to form and insufficient light, nutrients and species for an ecosystem to develop.	The teacher does not have sufficient expert power, referent power, including enthusiasm or information to engage students and stimulate learning
Upper flows threshold	Excess of exergy beyond the limits of tolerance of extant species or that prevent the establishment of pioneering species. Excessive nutrients reach levels of toxicity. Over population of certain species or an invasion of pests cause the ecosystem to collapse.	Teacher displays too much expert power and presents information in a compelling manner that lead students astray. Class becomes excessively stimulated, behaviour is erratic and chaotic (cf <i>Dead Poet's Society</i>)
Flows	Flows of exergy, material and information that generates and maintains dissipative structures	Flows of power, emotion and curriculum content that generates and maintains dissipative schemas
Exergy	Energy available for useful work – light for photosynthesis	Power (after French & Raven, 1959; Martin, 1978; Finn, 2012) Expert power

Materials	Nutrients	Affective Resources: Power (Finn, 2012)
Information	Species	Curriculum content
Context	The environment of the open system	<i>The New Zealand Curriculum environment</i>
Positive feedback	The increased activity in one part of the system will increase activity in all other parts; e.g. autocatalysis.	Gradual incremental learning or sudden insight, the a-ha or eureka moment where new information combines with multiple sources of memory to create thought (Milner et al., 1998) – where one idea reverberates and revises all others;. (Ehrenberg, 2010; Durswietz et al., 2010)
Negative feedback	Feedback to maintain the system on course	Guidance from the teacher or peers to keep the other on task or to maintain a desired course of action

I begin by describing the notions of attractors, state space, and domains in both system and ecosystem terms.

The SOHO systems form around attractors, that is, a full collection of interplaying features that determine where the system is located constitutes the system's attractor. The attractor is the nexus of the system (Prigogine, 1987), and could be thought of as the ecological template for a specific ecosystem (Kay, 1999). A SOHO system may have a number of attractors where it may shift during the course of their existence and evolution (Kay, 1999; Hobbs & Norton, 1996).

State space is the space in which the total number of possible attractors for the system can exist (Kay, 1999 p.5. The moments of shifting are generally abrupt and dramatic changes (see Figure 8.1). This *flipping* will occur given changes in flows of resources or other factors that reach certain critical thresholds. The domain can be thought of as a propensity to remain in place, like a gravity well (Kay, 1999). The domain is also the window of vitality the upper and lower thresholds for self-organisation beyond which the system will become chaotic (Ulanowicz cited in Kay, 1999). In other words, a system has a propensity to remain within a certain domain (see Figure 8.1). The inherent conservatism of the system can in part be explained as a tendency to resist any shift away from equilibrium. The system is governed by two ever present general tendencies: to move toward disorder, and to move towards order. In other words, in terms of a fire prone forest there is a tendency to gravitate towards

thermodynamic equilibrium of the ash of a destroyed forest, and conversely towards a climax forest ecosystem.

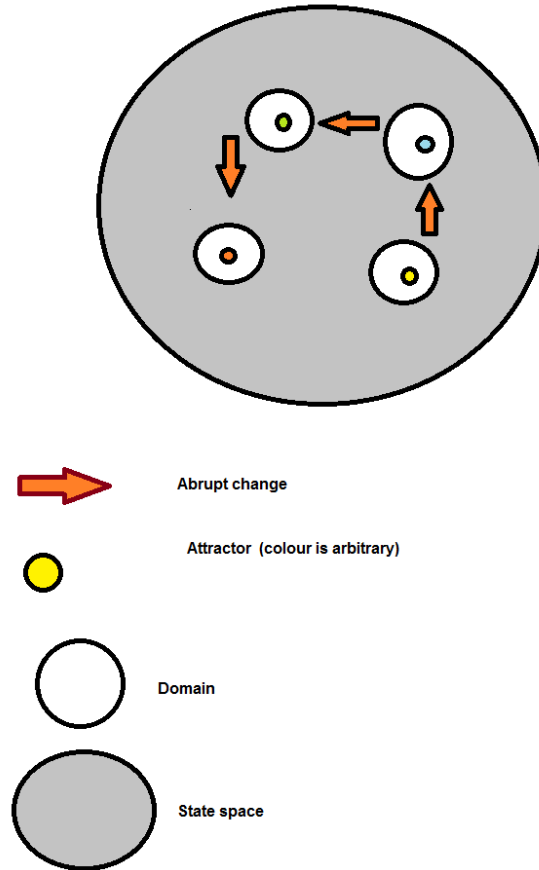


Figure 8.1 General spatial conceptual configuration of the SOHO system elements of state space, domain, attractor, and abrupt change based on Kay (1999). The attractor for students is a belief system, peer grouping, allegiances, and so on. For a learner the domain would be the zone in which students feel most secure in relation to a particular belief, and the zone that they defend when challenged. The state space is the range of domains available to the learner.

The Classroom as a SOHO System – The Role of the Teacher and Researcher

In the following passages I briefly look for possible metaphors to be drawn from Kay’s SOHO system spatial patterns described above. I begin with attractor, followed by domain, and the associated notion of conservatism, state space and the role of the teacher and the researcher.

The attractor for students could be a belief system, a paradigm, a cult, a new religion, a political point of view, an ideology, peer grouping, allegiances, and so on. To be compelling

an attractor could have a basis in the human condition. In this thesis I have used E.O.Wilson's conceptualisation of the human condition as a combination of preoccupations with death, self, and chaos in combination with hardwired yet culturally malleable predispositions an epigenetic rule (re: E.O.Wilson, 1998). Shifts to different attractors could occur at various scales. In terms of social grouping it could lead to a change of allegiances that are associated with the new paradigm.

The domain of an attractor is the region in which the overall system will resist being moved; a sort of inherent conservatism. For a learner the domain would be the zone in which students feel most secure in relation to a certain belief, and the zone that they defend when challenged. This is reminiscent of the embeddedness-effect whereby the individual resists novelty and change, and is in opposition to the activity-effect which is an attitude of curiosity and openness (Schachtel cited in Karpiak, 2000) which represent human responses to difference. The tension between adaptation and conservatism characterises societies as well as individuals (Karpiak, 2000), and may also include feelings of nostalgia as a response to change (Sedikides et al, 2008).

The state space for a learner would be the range of possible alternative stable states the learner moves to during the course of the development of a solution to a problem, or to the development of a state of mind.

Not unlike the SOHO ecologist in the field, the role of the researcher and the teacher of consilience is to scope and to catalogue the range of alternative beliefs (i.e. attractors) that could draw students away (i.e. abrupt change or flips) during tasks that challenge their values (i.e. state space) as well as to determine the limits of the resilience of their beliefs before their belief is eroded (i.e. domain).

Dissipative Structures

In the next section I discuss open systems and their relationship to flows of energy, material, and information, while drawing analogies for the teaching and learning experience in the classroom. All open systems dissipate incoming exergy (energy useful for doing work) by generating structure and order, but there is a minimum flow required to begin the generation of dissipative structure. The more exergy that flows into a system, the more structure will be produced. When the flow increases beyond the system's capacity to make structure and dissipate the flow, the system may become unstable, chaotic, and collapse (see Figure 8.2a).

Kay (1999) illustrates this phenomenon with the case of Bénard Cells. When a liquid reaches a particular temperature hexagonal columns will form in the liquid and then when the temperature of the liquid extends beyond that level the liquid will begin to boil, and the columns will become unstable and breakdown.

There are five components from which to draw generally analogies for the classroom:

- a) context
- b) flows consisting of
 - i. useful energy or *exergy*
 - ii. materials and
 - iii. information
 - iv. and the factors that impede structure development
- c) lower threshold
- d) structure formation
- e) upper threshold
- f) high entropy waste products

Context, in Kay's (1999) model of SOHO systems, comprises the three elements of flows: exergy, materials, and information. I begin with an elaboration of flows.

Flows

Flows of useful energy (referred to as *exergy*) material and information generate and maintain dissipative structures. In the following passages I elaborate these elements and draw metaphors with teaching and learning. I describe the role of light, nutrients, and information in a forest ecosystem ACC and develop analogies with teaching and learning. Light, I consider as expert power, nutrients as referent power after Raven and French (1959), Martin (1978) Tauber (1993), and Finn (2012). *Information* I consider as memes after Dawkins (1978) and Blackmore (1999).

Nutrients and Light: Emotion and Power

Large scale fire disturbance is natural and vital for rejuvenation of northern forests in Canada and northern United States. With the light blocking canopy of forest trees destroyed, and nutrients that were locked up in the bodies of vegetation and animal life liberated into the soils as ash, seeds released from cones under intense heat readily germinate and thrive (Holling, 2001). There is interdependence between light and nutrients, where both light and nutrients are required at minimal levels to engender autotrophic growth. In other words,

abiotic conditions must be right to facilitate the arrival and colonisation of disturbed ground by plant species and other organisms (Krebs, 2001). The biodiversity component of ecosystems is referred to as *information* (Kay & Schneider, 1994; Kay, 1999) which I discussed later in this section in relation to the meme concept. In the following passages I will develop analogies for the ecological limiting factors of nutrients and light for the classroom. I consider that light and nutrients to be analogous to affective elements in the learning process and species or information akin to knowledge.

In this way, just as species require minimal abiotic conditions of light and nutrients to promote growth, so it is necessary for a teacher to provide affective conditions or perform a mentoring role in order to relay information, stimulate critical thought (Cozolino & Sprokay, 2006) and thus promote the acquisition of knowledge from experience (Davis et al, 2000; Kolb & Kolb, 2009).

Soil nutrients could be thought of as metaphorical for the conditions that enhance both the quality and quantity of ideas and their creation. To distinguish nutrients from light, but to be consistent with the image of soil, we could say that nutrients are found at ground level of the students; that is, they are affective resources, the entourage of the learner, such as in the home and with peers. Such factors determine self-esteem and how well students learn (Ingleton, 1999; Weiss, 2000).

Light could be that which enlightens, and facilitates the flow of information. Light also generates conditions conducive to learning, and is thus closely related to the function of nutrients in this metaphor. This could entail the level of Expert and Referent Power of the teacher which together determine classroom ambiance and inter-student relations (Tauber, 1993). French and Raven (1959) define social power the potential of one person to have an effect on the attitudes perceptions, and/or behaviour of another. They identify five forms of power: expert, referent, resource, legitimate and coercive. Finn (2012) considers referent and expert as prosocial and conducive to promoting learning, where as coercive, resource and legitimate as antisocial and having a negative impact on learning.

Students may also learn from each other (Ingleton, 1999). Their peers may they also may possess such power and therefore could be seen as having light. Further, the affective/emotional environment generated by the teacher and other systems associated with the teaching profession relates to the teacher's entourage, her personal life, professional sphere, administration and sources of the curriculum, assessments education policy and so on

(Arrivee, 2012). The impact of the assessment regime on teachers and students in language learning otherwise known as *washback*, (see East & Scott, 2011a) could be put into the analogous category of light. Positive washback could be associated with optimal light conditions for growth, whereas negative washback could be thought of as creating obscurity and confusion.

Memes: Propagules as Information, Species as Knowledge

The purpose of this section is to propose that ecosystem propagules are analogous to information. That is, propagules are to the ecosystem as information is to the mind, and species are to the ecosystem as knowledge is to the mind. Further, the way in which an ecosystem sorts the propagules that arrive on site is analogous to the way in which the mind also sorts information that the mind perceives. Propagules such as spores, bacteria, seed rain, the seed bank, and animal colonisers, I refer to as *information*. Established populations of a species in a community I term *knowledge*. Collectively information and knowledge I consider as *memes*. It is necessary to explain the nature of memes and current meme theory before going further into this analogy of information as propagules.

Memes are replicable units of culture. They are any idea big or small that can be and also wishes to be imitated. Some are successful and spread with ease and rapidity through the mind and through human culture. Some may diverge into separate entities not unlike the emergence of new species in Nature (Blackmore, 2000; Dawkins, 1986). Thomas Kuhn referred to science as Darwinian in this very sense (see Hacking's, 2012 introduction to Kuhn's *The Structure of Scientific Revolutions* p.xxxii-xxxiii). Some memes may fail to survive because they are difficult to grasp and remember, they thus fall into obscurity and are forgotten. Effectively, such memes become extinct.

Note in the opening sentence of this paragraph I said that memes may wish to be successful. In attributing will to a meme was not figurative. Blackmore (2000) argues that if the body or organism is an elaborate vehicle for its genes as Dawkins first proposed in 1976, then the mind is similarly just a means of carrying and disseminating memes for the memes' sake. That is, not unlike the gene, the meme too has a life and a will of its own (Blackmore, 2000).

Memes evolve like genes. Memes follow the same three step algorithm of replication, variation and selection. This lockstep sequence will lead to evolution by natural selection (Dennett, 1996; Blackmore, 2000). As a meme is communicated from brain to brain there is

variation of interpretation (Dennett, 1996). Replication with variation appears to be consistent with both constructivist theory that claims knowledge cannot be transferred intact from the brain of the teacher or the pages of a textbook without being filtered and made to fit into previous existing knowledge and experience of the pupil. The feature of variance in copying is also prominent in the claims to relativism in determining the meaning of texts and almost all reality of poststructuralism and social constructionism (Lorsbach & Tobin, 2009).

McNamara (2011) identifies two forms of the meme: the internal or *i-meme* and the external or *e-meme*. The e-meme is the expression of the information outside the human mind. The e-meme is the articulation or external manifestation of the information It is perceived by our sense organs be it a perfume, a painting, a piece of music or a word and so on. The i-meme on the other hand is the neural manifestation of the information. That is, it's neural coding and all its connections; a kind of neural register and a template for future recognition and transmission. In ecological terms, the i-meme could be thought of metaphorically the organism in its ecological niche in the human mind.

A description of i-memes includes that they are not innate but must be learned (McNamara, 2011). The learnability of a meme depends in part on how it is engineered to appeal to the human mind and how well it conforms to the landscape and climate of innate predispositions of human preferences or the epigenetic rules of mental development (see E.O.Wilson, 1998)

Genes code for characteristics that help the individual survive in their natural environment. We could call the environment in which genes carried by species struggle for existence, their substrate. The substrate of species is the ecosystem and on a larger scale it is the Biosphere. If genes are analogous to memes, then the substrate in which memes compete could be the human mind. For an idea or meme to colonize a person's mind (see Dawkins, 1989; Blackmore, 2000) it must also pass through a series of filters. I consider such filters to be in part the E.O.Wilson's epigenetic rules. Secondly, the new idea may do a number of things to establish itself. It could dislodge an existing idea by proving itself better. It may also act as an add-on or an accessory, or it may simply colonize vacant ground. Blackmore (2000 p.231) also uses a filter analogy for the process of the ongoing formation of self. Drawing on Dawkins (1989) who describes religion as *co-adapted meme complex*, that is a collection of co-dependent ideas. Blackmore (2000) argues that the self also falls into this category of *memeplexes* which she calls the *selfplex*. For Blackmore (2000) the selfplex is a collection of interdependent memes, not unlike a religion or an ideology. The selfplex is both self-

organizing and self-protecting. It protects itself with a filter system (Blackmore, 2000) that accepts or rejects other incoming memes

With the above description there appears to be the possibility of forming an analogy between the animal and plant communities in an ecosystem, and memes in the human mind. This could be extended where the full collection of ecosystem comprises the Biosphere, so the full aggregation of human minds would represent the *memosphere*. Blackmore (2000) uses an analogy of a tilled vegetable garden to represent an empty mind that will be invaded by weeds. She says that a meme will establish itself when there is space in the mind that has opened up, in the same way as seeds in the soil will germinate given disturbance. She also talks about the mind as a forest where trees compete for light and resources. Here memes compete for attention and the opportunity to be talked about and expressed thus spread.

Lower thresholds and upper thresholds.

Lower flow thresholds and upper flow thresholds could be viewed as analogous to arousal limits for learning (Cozolino & Sprokay, 2006). Learning occurs during moderate states of arousal. When arousal is too low the learner is unmotivated. When the arousal is too great the student cannot sit still and listen (Cozolino & Sprokay, 2006).

In the classroom context the lower threshold of expert and referent power could be represented by the teacher who does not connect information to the lives of the student, nor have sufficiently high expectations of students, charisma and authority to unify the class. Low teacher expectations of student ability prevent learners from succeeding (MoE, 2007), to the extent that low expectations become a self-fulfilling prophesy, and thus eliminating the possibility of a positive *Pygmalion effect* (see Rosenthal & Jacobson, 1968; Kunter, Frenzel, Nagy, Baumert, & Pekrun, 2011). Teacher enthusiasm would be excessively low so that students remain disengaged (see Zhang, 2014). There would be no spark to mobilise intrinsic student interest, motivation, or curiosity that could lead them to experience vitality (see Patrick, Hisley, & Kempler, 2000). Patrick et al., (2000) speculate that teacher enthusiasm leads to learner autonomy. Low enthusiasm may do the opposite and make students believe they cannot succeed, nor want to succeed. Low teacher enthusiasm may also be associated with poor classroom behaviour but teacher enthusiasm could be taken by adolescents in a derisive fashion and work to discourage students (Patrick et al., 2000).

Low entropy/high order structure formation.

In the Reorganisation or α -phase with sufficient referent and expert power from the teacher, in combination with complimentary affective and information resources, students will be curious, engaged, and ready to seek from the teacher the wisdom, judicious guidance, and feedback to help them solve a problem or investigate a topic. In this scenario students are engaged, motivated, and creative. They work on their own volition, either alone or in groups of peers. Students in the constructivist classroom draw on the referent and expert power, not only from the teacher, but also from their classmates, who have been inspired by the teacher. The students produce structured and intricate ideas that dissipate not only the flow of power from the teacher and their classmates, but also the anxiety generated by the disturbance event presented to students. Such complex ideas are the "results of a transaction which occurs when teacher or researcher meets child" (Harste, Woodward, and Burke cited in Weaver, 1984 p. 307). The ideas in the form of student work, such as an argument or dissertation, dissipate the anxiety generated by the disturbance event. The ideas are solutions to perplexing situations, to a cognitive dissonance, to the conflict established by the teacher. In the classroom where consilience is being used, the problem is existential and raises profound questions of the human nature (see Figure 4.2). The use of E.O.Wilson's (1998) consilience in the language classroom, puts the student face to face with the question of we as evolved human beings or how we are created entities (see E.O.Wilson, 1998). Any creative response allays the anxiety, and thus dissipates the tension generated by the perplexing situation. The dissipation of anxiety has an overlap with the concept of *sympathetic magic*, whereby an artistic representation of a fear or anxiety mitigates the anxiety (see Fraser, 1922; Dissanakye, 1988; E.O.Wilson, 1998).

Porush (1991) interprets fiction as having an analogous overlap with Prigogine's notion of dissipative structures. He asserts that the text is a "biosocial phenomenon" (p. 62) that can create order from chaos in the form of creating epiphany:

The moment of insight acts like a dissipative structure. The explosively meaningful reorganisation and addition of information in the reader's mind, the revelation, is entirely consonant with the activity of the dissipative structure (pp. 68-69).

The text, or more precisely the reader's interpretation of the text, is a complex structure that may serve as a means to generate more order through reorganising scattered ideas in the reader's mind. Porush's notion of the text as dissipative structure rings true with the

experience of reading that stimulate the flow of ideas as expressed by Bertrand Russell (1946) on the way he writes. Further, for Porush (1991), the mind is both a product of dissipation and the producer of dissipative structures; in other words the mind is the product of ideas and the producer of ideas. As Prorush says:

...the mind is among the ...most fertile dissipative structures... itself a product of the dissipative structuration of biological evolution and in turn a great progenitor of other dissipative structures, like technology and literature which extend its power and promulgate information (p. 384).

To summarise the difference between my interpretations of the artistic creation, including the text as a dissipative structure, and that of Prorush, the creation of cultural artefacts are the creative means to mitigate the tension generated by the awareness of the prevalence of chaos, self, and death. The cultural artefacts, be they scientific inventions or artistic creations, such as fiction, may serve the same purpose of creating order for the user of those artefacts be they are consumer of machines, or the reader of a novel, a philosophical text, or the like. The text creates order through its fabrication and through being used. The text may be considered a structure that is able to create more structure. In other words, the structure creates more meaning in the face of a flow of information, exergy and materials delivered to itself in the classroom context.

The successful ideas and solutions accompanied by teacher *contingent praise* (praise for effort and improvement), *attribution feedback* (attributing outcome to effort) and *goal feedback* (promoting realistic and attainable goals) that students produce have the effect of enhancing self-esteem (Robins, Trzesniewski, & Donnellan, 2012 p. 6). Further, dissipation of challenges from the teacher may also move the student closer to the status of the teacher in terms of referent and expert power. In other words, by making students autonomous, self-sufficient, and eventually enabling them to counter, or generate such power themselves, students may come to equal the teacher and thus quell or neutralise the teacher's flow of exergy in the form of challenges to learner stability. These are acts of deflecting the challenge and dissipating the teacher's exergy. This scenario may have overlap with Freire's notion of dialogue where the student and teacher mutually challenge each other.

At the point where the teacher and learner are in a particular situation equal exergy inputs (that is challenges to the learner) should be at the point exactly balanced by dissipation structures (solutions created by the learner). At such a stage there would be no longer an

energy gradient –the flow of energy into the system is too little to build new structure and insufficient to flow through all the intricacies of the structures; that is, to connect up other structures. The pupil at this point will know that the teacher has no more to teach. There may be a point where the balance tips from the student to the teacher, where it is the student who challenges and creates a flow of exergy, which transforms the teacher.

High entropy waste.

The generation of ideas (memes) is a biological process that occurs within the human brain (Weaver, 1985; Dodonov & Dodonova, 2011). Ideas are created and stored organically. They are materialised physically in terms of sound waves in speech or in writing or pictorially using external media. The waste products produced in the production of ideas as they are formed in the mind would also be the products of cell respiration and the heat generated through their articulation. Bartlett explains it this way, “the schemata are ... living, constantly developing, affected by every bit of incoming sensational experience of a given kind” (Bartlett cited in Weaver, 1985 p. 306). In this way, Bartlett is suggesting that meaning is not a product but a transactional process of redefinition between the learner and their surroundings (Weaver, 1985).

In a classroom, or in the privacy of a study, waste could be thought of as paper drafts, notes, heat from electronic devices, and so on. If we are dealing with the learner maintaining a belief, then the waste products from their defence would be the energy released from the creation of an argument to deflect a critique. That is, the products of domain defence.

The shifting to alternative attractors, and the process of creative destruction entails rejection of obsolete, maladaptive, and wrong ideas. Dodonov & Dodonova (2011) refer to this process as dissimilation, the opposite of Piaget’s assimilation, where useless components of schemas are discarded.

To my mind the discarded ideas are used in the reconstruction of new ideas in a manner reminiscent of *self-referencing* (Prigogine, 1980; Prigogine & Stengers, 1984), and Mantura & Varela’s (1980) notion of *autopoiesis* whereby life forms improve themselves drawing on old but successful patterns and structures (O’Sullivan cited in Gilstrap, 2007). This process is analogous to remember in panarchy. As wilful agents, students can choose or reject aspects of historic structures they would like to bring forward into recovery (Gimmell & Smith cited in Gilstrap, 2007) in the creation of new structures or ideas.

Self-Organisation

Self-organising dissipative structures emerge whenever sufficient exergy is available to support them. (Kay, 2000 p. 18)

In this section I elaborate on the mechanism for the generation of structure from exergy flow, and also the phenomenon of increasing connectivity through the multiplication of structures; that is, ideas and thus the generation of diversity and wisdom. I use Kay's (1999) conceptual model of self-organising systems as dissipative structures as shown in Figure 8.2a.

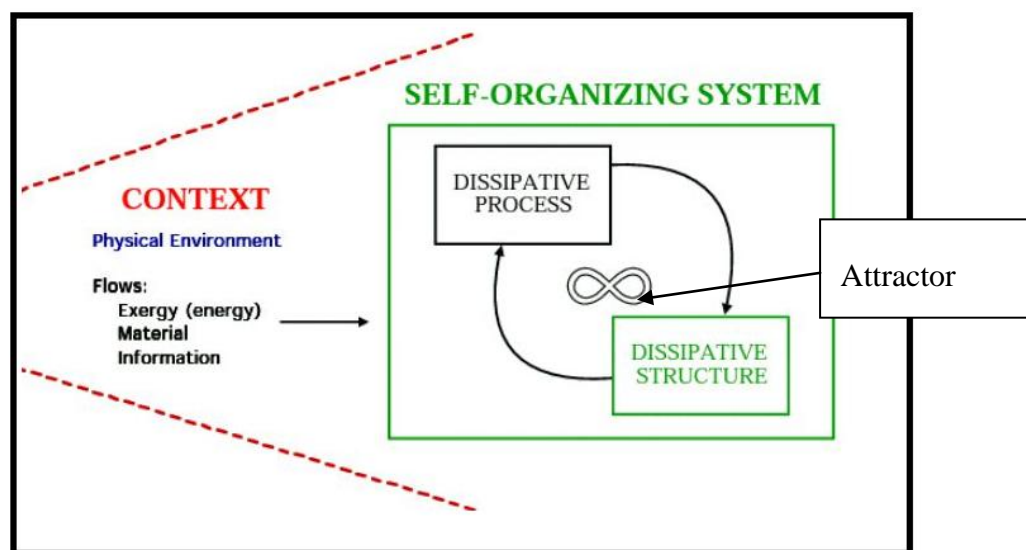


Figure 8.2a Kay's (1999 p. 19) original conceptual model of self-organising systems as dissipative structures.

The dissipative process/structure (Figure 8.2a) creates a new context that modifies flows and this leads to a new process/structure which in turn modifies flows and changes the context and leads again to more process and structure. As Kay (1999) explains:

These structures provide a new context, nested within new processes can emerge, which in turn beget new structures, nested within which new processes can emerge, which in turn beget new structures, nested within which... Thus emerges a SOHO system, a nested constellation of self organising dissipative process/structures organised about a particular set of sources of exergy, materials and information, embedded in a physical environment (p19).

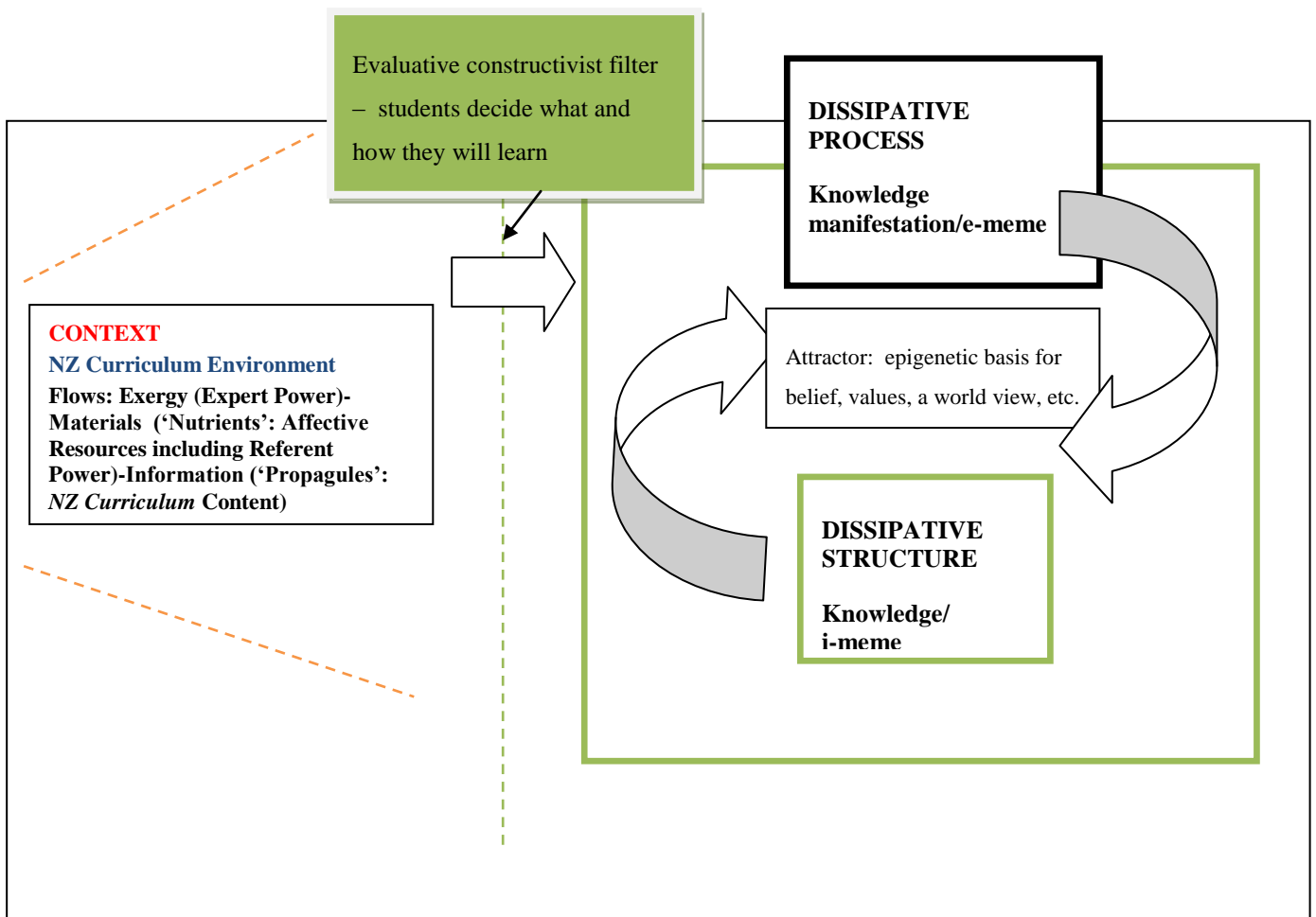


Figure 8.2b Kay's (1999) original conceptual model of self-organising systems as dissipative structures adapted for *The New Zealand Curriculum* Context. The green vertical broken line between context and system represents evaluative constructivist filter, whereby the learner system filters the curriculum content/information she wants to receive to meet her goals.

As mentioned earlier, McNamara (2011) identifies two forms of the meme: i-meme (internal) and the e-meme (external). The e-meme is the expression of the information outside the human mind. The e-meme is the articulation or external manifestation of the information. It is perceived by our sense organs be it a perfume, a painting, a piece of music, or a word. In contrast, the i-meme is the neural manifestation of the information, whereby it is a kind of neural register and a template for future recognition and transmission. In metaphorical ecological terms the i-meme would be the organism in its ecological niche, in the human mind. I suggest that the dissipative structures and dissipative processes could be usefully thought of in terms of McNamara's (2011) concept of i-memes and e-memes. For

McNamara, i-memes are not innate but must be learned (2011). The learnability of a meme depends in part on how it is engineered to appeal to the human mind, and also how well it conforms to the ‘landscape’ and ‘climate’ of innate predispositions of human preferences or the epigenetic rules of mental development (see E.O.Wilson, 1998)

Context and flows.

The context is the physical environment in which the open system finds itself. The context consists of flows of exergy, raw materials and biological information. To this adaptation of Kay’s (1999) conceptual model I have added the analogue to the ‘ecological filter’. This filter lies between context and the self-organising system.

In the next section, I discuss biodiversity and the diversity of ideas in relation to exergy/power dissipation results in a continuum of wisdom.

The Teaching and Learning of E.O.Wilson’s *Consilience* as a SOHO System

Here I integrate the theory of the teaching and learning of consilience in the New Zealand secondary school system with Kay’s (1999) SOHO system. Central to the teaching and learning of consilience is what I have called *Wilson’s triad of human concerns* adapted from Chapter 11 *The Arts and their Interpretation* from E.O.Wilson’s *Consilience*. The triad represents the three central concerns of human existence, which to my mind in many ways comprise the human condition. Humans are aware of and contemplate their death, the unpredictability of the universe, and the nature of self. Responses to these questions of existence have given rise to culture, which may be further divided into the arts and the sciences (see Figure 8.3). The awareness of death and afterlife as the attractor could be used to illustrate how the model could function. Flow that delivers challenging information relating to death and the afterlife may engender structures and processes of schemas, ideas, or memes as solutions. These structures function to dissipate the incoming flow.

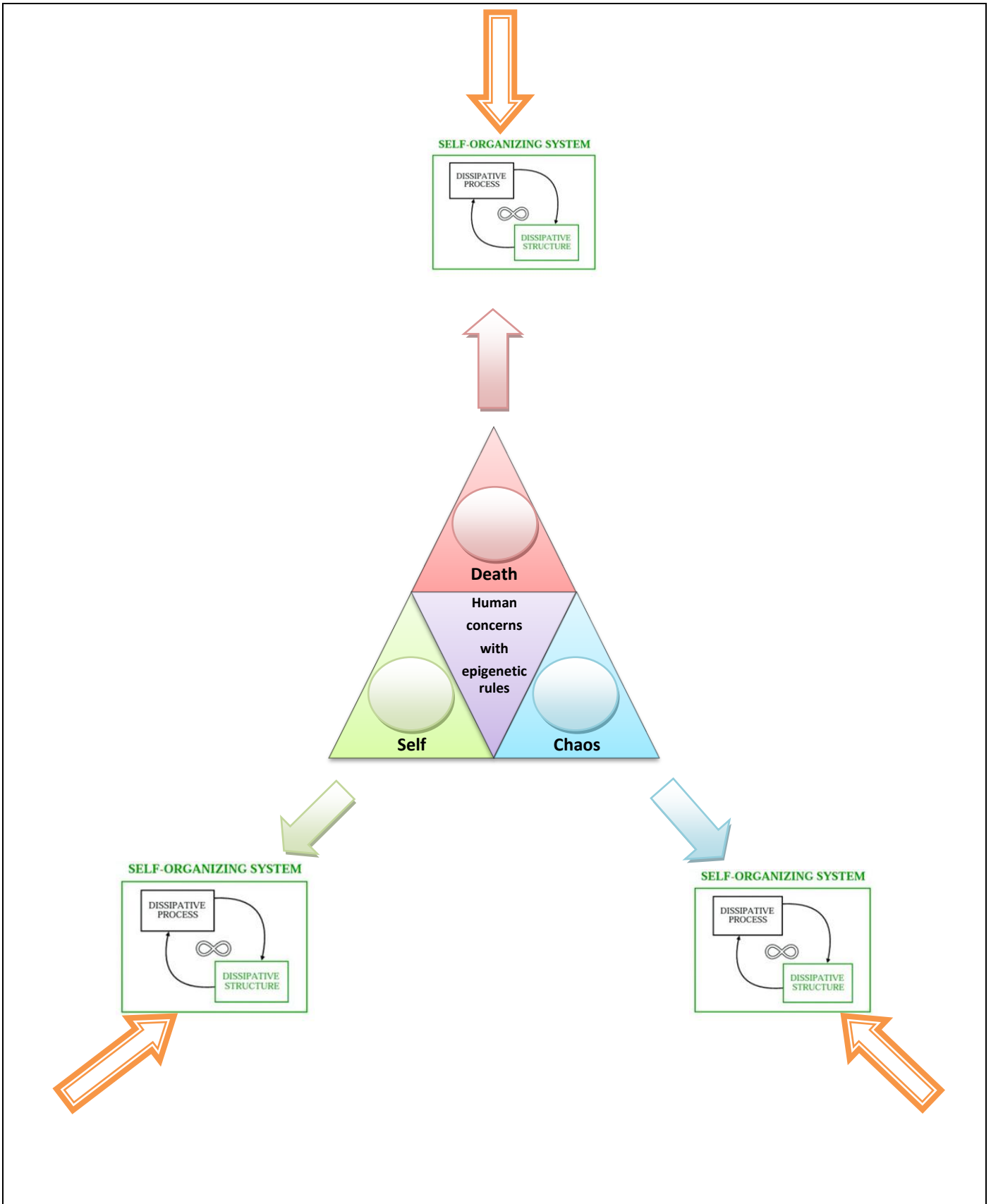


Figure 8.3 Conceptual model of the role consilience plays in the generation of ideas in the classroom.

Figure 8.3 shows a conceptual model of the role consilience plays in the generation of ideas in the classroom. The attractor could be values relating to death and afterlife act as grounding the learner in a certain conceptual space. Students will defend their beliefs assimilating and accommodating new information to maintain their status quo. If flow of power is steady the student will process many ideas until satiation and inevitable collapse/release. Flow of power is the flow of challenges for an organism, and its response is adaptation. Adaptation is learning. The type of dissipative structures and processes are determined by the nature of the attractor and the quality of the power, the type of information and materials, or I have referred to as it the ecological /learning filter. Resistance generates structure. Exergy is in the form of expert and referent Power, and the idea that emerges is the learner's response.

SOHO Systems and the Adaptive Change Cycle

Kay (1999) examines Holling's ACC and interprets it in terms of a SOHO system. The additions are informative and it is useful to examine them as they may deliver insights that help explain classroom dynamics. I discuss the K Conservation in the front loop of the cycle and point α at the peak of the back loop of the cycle, and then I draw connections with the adaptive cycle of teaching and learning.

For Kay (1999) the front loop is governed by two fundamental attractors: the pull down to high entropy thermodynamic equilibrium of total system collapse and the attractor of maximum organisation, maximum storage, and maximum dissipation of exergy. At point K the system is delicately balanced between the two attractors, but as Holling (2001) points out, the system is destined to collapse as the autocatalytic system of ever increasing structure and connectivity will become brittle and unable to react/adapt to a sudden change from the outside.

Autotrophs refers to plants that can fix atmospheric carbon into organic compounds. After a system collapse nutrients tied up in plant material are released through the processes of decomposition by heterotrophic organisms (organisms that cannot build organic compounds from the fixation of atmospheric carbon). Once all the organic matter is decomposed and a maximum amount of nutrients are released the Reorganisation phase collapses and the exploitation phase takes over with the advent of autotrophs, put simply, plant life. This is the formation of the back loop (see Figure 8.4).

Autotrophic collapse.

The two opposing attractors are of maximum storage and exergy consumption. The lower attractor is that of familiarity, nostalgia, and the authentic. This gives the learner the desire for belonging and an inherent conservatism. The upper attractor is the result of the production of structure and process through the flows of information, materials, and exergy. The structure and processes result from the relationship between the pull of the lower attractor and the flows. The progress towards the upper attractor is as fundamental as that of the lower attractor. The movement to K is adaptation in response to challenges imposed by the teacher and peers.

Heterotrophic collapse.

Heterotrophic collapse represents a vital turning point in the learner negotiation of meaning, whereby there is an authentic learning experience. Learners transition from confusion to the creation of ideas from remaining fragments (Figure 8.4).

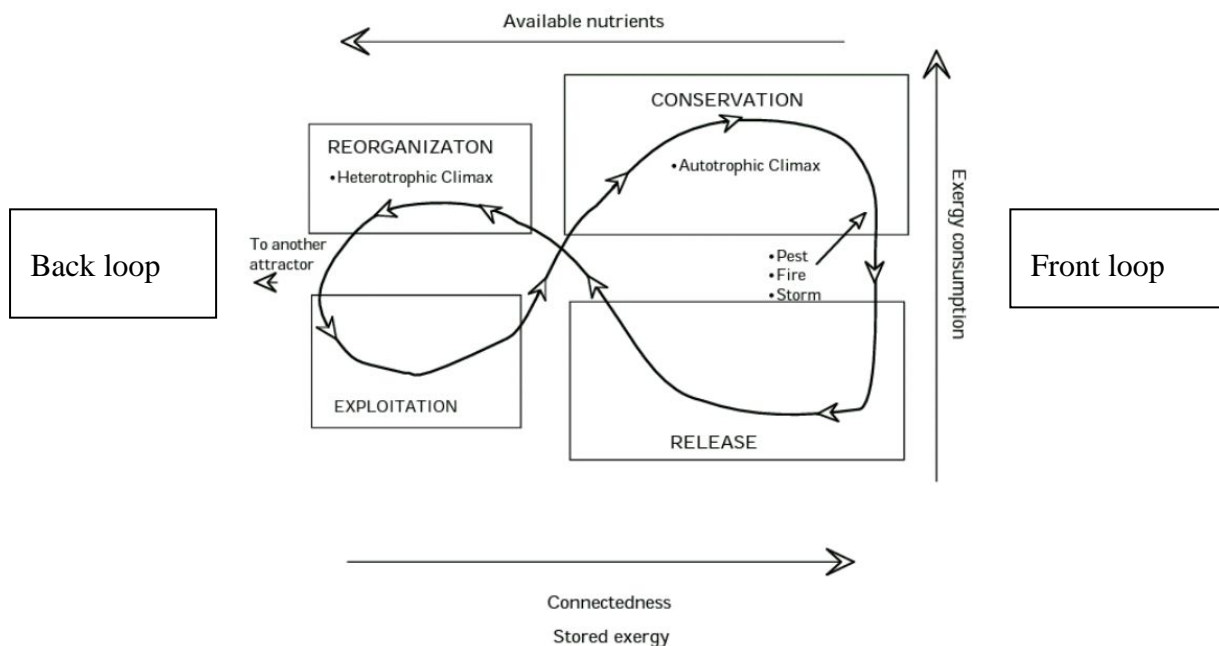


Figure 8.4 Holling's (2001) ACC interpreted as a SOHO after Kay (1999).

As the ecosystem develops and grows it produces more structure that is made up of connections in the form of chemical bonds and relationships. There exergy is stored in the form of biomass. With more biomass there is more exergy consumption, and in turn more structure is produced. The ecosystem becomes more and more complicated, consumes more

exergy and becomes more efficient at dissipating exergy. The paradox in the front loop is that the ecosystem is drawn to the attractor of the mature forest, but at the same time, given the high connectedness and stored exergy, the ecosystem is vulnerable to have this exergy exploited by another self-organising system (such as fire, or pest outbreak) leading to collapse of the vegetation system or autotrophic collapse. Once collapse has occurred, exergy consumption falls dramatically and the exergy and nutrients locked up in the structures of the forest ecosystem are gradually released through the microbial systems. The ecosystem is also drawn to the attractor of heterotrophic collapse in the back loop. This occurs once the existing structure is broken down and conditions are right for the return of plants (Figure 8.4).

Summary

The self-organising system in the classroom may be thought as an ACC, which in turn can be interpreted as a SOHO system. In this chapter thus far, I have suggested that the learning in the classroom environment can be seen in an analogous way. The classroom is embedded in the context that is parallel to the environment in the SOHO system (Figure 8.2b). The flow in the classroom metaphor could be composed of information, the power, and affective resources of the teacher and also students' peers. If the flow is below a specific threshold it will have no impact on students and it will be ignored. If the flow is above a critical lower threshold, a dissipative structure will form. This dissipative structure is an idea, a schema, or meme, developed by the learner(s) in response to challenging information or curriculum content. This information is embedded and influenced by the expert and referent power of the teacher as well as by the student's peers. The emergent idea could be a solution to a problem that was set up by the teacher.

In this metaphor the idea has two facets, that of a dissipative structure and of a dissipative process. In the classroom context this could be an answer to a question, an essay, a podcast, or other creative activity. The dissipative process of the idea will be to assimilate and accommodate both the information as well as the expert and referent power of both teacher and also student peers. Continued and increased flow of affective resources and information will increase the number and intricacy of dissipating structures and ideas. The dissipative process of an idea may have overlap with the e-meme McNamara writes about (2011), whereas the dissipative structure could be the neural composition of the idea which McNamara would call the i-meme.

The dissipative structure and process form around attractors; in an ecosystem this is the template of the specific ecosystem . In the learner an attractor could be a world view that has an epigenetic foundation. This could be a belief system that has its origins as an expression of fundamental human nature. The attractor for students could also be peer grouping, allegiances, and on the like, that have a basis in the human need for socialisation and belonging.

The self-organising system is comprised of two inseparable parts of dissipative structure and dissipative process. The dissipative structure is the shape of the system, and the dissipative process is what the structure does. Kay (1999) illustrates this idea very simply by describing water that is draining from a bath. If the flow is sufficient a vortex forms; this is the dissipative structure. The dissipative process of the structure is what it does, which is to flow out of the bath. Note that the dissipative structure is produced by the flows from outside the system. Within a minimum and maximum threshold of flow, a vortex will form. This range is the domain of the attractor. The attractor in this example is the force of gravity. The stronger the current the more elaborate the vortex structure becomes. Each convolution dissipates even more the incoming exergy. That is, the more structure there is, the more dissipation there is, and the more dissipation there is the more structure there is and so on. Thus a malleable material that is drawn to gravity well and faces a flow of energy will resist that flow and maintain its grounded position. The effect on the material will be for it to take on a specific shape or structure that corresponds to the force of the flow of energy and the nature of the material. Continued flow and increased flow will engender more structures that dissipate the energy flow and the impact of the material.

The self-organising system in the classroom may be thought of in a similar way: The flow is composed of the power, the affective resources of the teacher, the students and information. If the flow is below a certain threshold it will have no impact on the students and it will be ignored. If the flow is above a critical lower threshold, a dissipative structure will form. This dissipative structure is an idea, a schema, or meme, developed by the learner in response to challenging information that is carried into the confines of the open learning system. The emergent idea could be a solution to a problem set up by the teacher. The dissipative process of the idea will be to assimilate and accommodate both the information and the expert and referent power of both teacher and other students.

If indeed teaching and learning can be considered as a metaphor of a SOHO system, then it would follow that continued and increased flow of quality exergy, materials, and information will increase the number and intricacy of dissipating structures. The formation of a dissipative process/structure creates a new context or environment the system's response a continued and increasing flow. The response is that new processes/structures are formed. These in turn modify the context and with continued flow leads again to more process and structure, and a growing complexity of the system as well as increasing capacity for exergy dissipation.

In the context of the classroom and the development of ideas would modify both the context in terms of flow of information because the teacher will not continue teaching the same subject once she believes the information has been acquired, but instead will introduce new content. The environment in which the schema is nested in the mind of the learner also changes with each new schema that forms in response to incoming flows of information and so on.

An Ecological View of Evaluative Constructivism

Bateson's theory is staggering. The mental system that governs how we think and learn, governs the evolution and ecology of all life on earth.

May on Bateson's *Mind and Nature* (1979).

The purpose of this section is to link Conner's concept of evaluative constructivism (Conner, 2014) into the theoretical framework thus far developed. I begin with an overview of constructivism, followed by an overview of evaluative constructivism itself. I focus on the interrelationships between learning intentions, choices in relation to student engagement, frustration, negotiation of tasks downwards, and non-participation. After this, I posit these interrelationships into the ACC specifically into the back loop or Reorganisation (α) phase. In the last part of this section I align the three dimensions of the ACC (potential/storage, connectedness, and resilience) to the key directors of intentions and choice in Conner's model.

Constructivism

Constructivism is learner centred, and learning in a constructivist classroom is reflective, interactive, inductive, and collaborative (Conner, 2014). The teacher acts as a facilitator and takes the experience of students into consideration when designing learning experiences that have been gleaned through various means, such as questioning. The teacher makes the student aware of the student's learning and thinking processes, which encourages meta-cognition. The teacher's role is to enhance the natural consciousness of the learning process in the learner (Gundstone, 1994) with the intention of enhancing the learning experience. In education theory meta-cognition has come to mean understanding of the requirements of learning, control of the learning process, as well as the regulation of cognitive procedures (Leutwyler, 2009).

Learning is affective context dependent. Situated conditional cognition is the creation and enhancement of learning experiences in a particular situation. Here teachers furnish the student/learner with the occasion to critique their own learning processes. Learners ask themselves what works in a given situation. The creation of learning experiences in the constructivist classroom can be seen as the generation of a zone of authentic experiential learning within the artificial context of the post-Industrial Revolution secondary school (see Gilbert, 2005). That is, it is the generation of the simulation of the authentic within artificial and anachronistic space of the school. The constructivist teacher creates an illusion of authenticity to induce the student into learning/acquiring information. In addition, in the constructivist classroom the teacher places value on the exchange of information and the mixing up of knowledge from the student participants, which raises the possibility of students creating something new. The teacher rejects the role of being the font of all knowledge or the disseminator of information.

Evaluative constructivism.

Whereas constructivism is primarily concerned with the step by step acquisition of information or curriculum content, Conner's notion of evaluative constructivism focuses on the progressive building of learning strategies for students to acquire such content, which is based on the premise of allowing access to the acquisition of content by making the learner aware of their capacity to acquire that content – to make the learner aware of procedural knowledge. In other words, the role of the teacher is to systematically reveal to and /or enable

the student to see that they are capable of acquiring the content, all they have to do is to be aware of their potential in the form of the arrays of strategies and tactics at their disposal to succeed. The student is thus made aware of themselves as learner, what they need to know in relation to the perceived task, the cognitive demand, and how the goals should be attained. These elements are referred to as the processes the judgements of learning and make up information processing theory.

As Conner (2014) shows, the learner has a tendency to choose learning strategies that have worked before, and have given success before. The role of the teacher is to encourage students to discover other more appropriate ways to attain success, by giving students the reflective tools to facilitate learner success: process prompts such guidelines, questioning protocols, mnemonics.

The two key elements or drivers of Conner's model of evaluative constructivism are: a) curriculum content also referred to as learning goals which she calls *intentions*, and b) the *capacity* of the student to acquire this content in the form of the student's range of tactics or strategies at their disposal to acquire such information. This she calls *choices*.

However, as Conner acknowledges her model only works if there is co-operation from the learner, that is, whether the learner is willing or sufficiently open-minded to acquire such content. She argues that students will be willing if they can be made aware of their capacity to succeed and acquire the content, and if it is made relevant. If students are willing to acquire the content then they have maximum intention. If students are aware of their capacity to acquire the content and have maximum choices available to them then they will be maximally engaged.

Intention and choice are intertwined and interdependent. For example, poor self-esteem or poor belief in one's capacity to learn will make the learning goals/intentions seem out of reach for the learner. If the student is willing to learn but does not think they can learn, this will result in frustration and low levels of engagement. In contrast, a student who believes they are able to acquire the information and attain the learning goals/intentions but who does not see the point in doing so will also be only marginally engaged, and may, as Conner shows in her case study, seek to discourage classmates and reduce the importance of the task; that is, to negotiate the task downwards. Simply stated, Conner's (2014) model shows that students will learn content if they are made to see that they are able to learn it, and if they see their

potential that too will increase the willingness to learn. Even so, willingness remains the central assumption and stumbling block in the system.

An ecological view of evaluative constructivism.

What follows is my view of Conner's evaluative constructivism, as seen from the ecological perspective developed in the previous sections of this chapter. I first summarise the relationships between the two main drivers in Conner's conceptual model of evaluative constructivism: intentions and choice, then I position her model of those relationships into Holling's ACC. Next, I describe Conner's model in terms of the three dimensions of Holling's model; that is, in terms of the vertical axis of storage/potential and the horizontal axis of connectedness, and finally in terms of the z-axis that represents the dimension of resilience.

Maximum engagement occurs when learners feel that they have a maximum capacity to acquire the new information contained in the intentions. The peak of intentions would be in NCEA the level of *Excellence*. The opposite relationship is when there is non-participation engendered by minimal potential or self-esteem where the learner cannot see any means at all to attain the learning intentions. This results in low engagement and NCEA *Non-Achieved*. Frustration on the left results from low potential because of an inability to see a means to acquire the new information and skills, and conversely, on the right hand side of the figure, the negotiation of tasks downward results from a high potential to complete the task, but a lack of willingness to do so. The role of willingness is pivotal in Conner's (2014) evaluative constructivism. The teacher's role is to inspire such willingness. The relationships and tensions between teacher and students in the evaluative constructivist classroom, described by Conner (2014), are depicted in Figure 8.5.

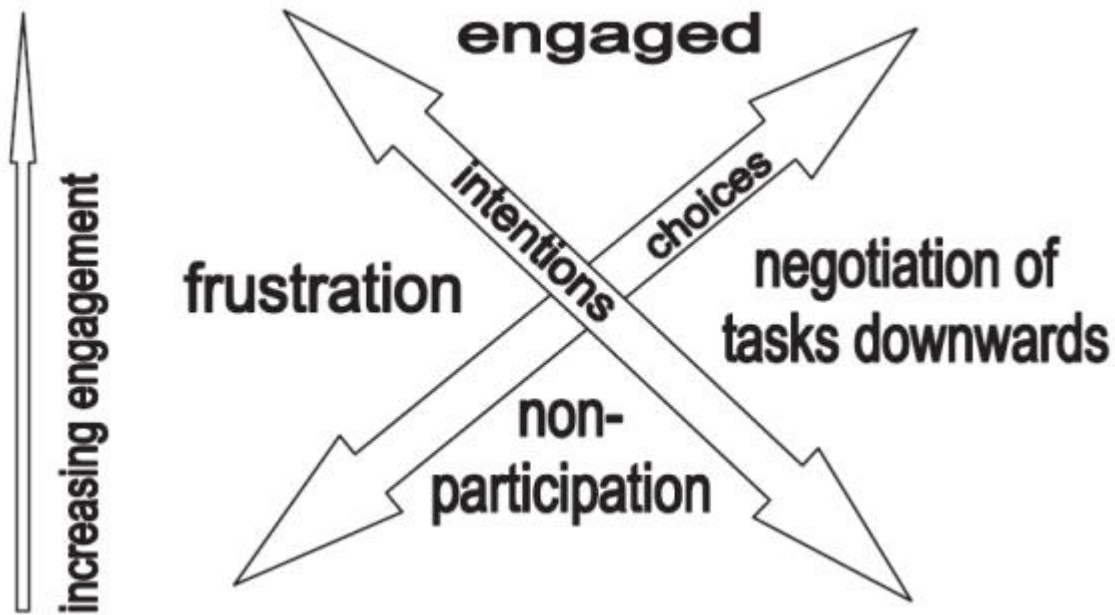


Figure 8.5 Relationship between learning intentions that is curriculum content, and then range of choices available to students to apprehend the learning intentions (after Conner, 2014).

The central tension in Conner's model is between incoming information (intentions) and the potential to acquire that information (choices), both of which are underpinned by willingness which may be generated by the level of potential of the learner (the span of choices for acquisition that the learner has) and the motivation to learn (to adopt the incoming material). Indeed the student would ask why should I learn this, and if I desire to learn it, how could I do it (Conner, 2014). Conner's model can be situated in the ACC at the Reorganisation (α) phase of the cycle (Figure 8.6)

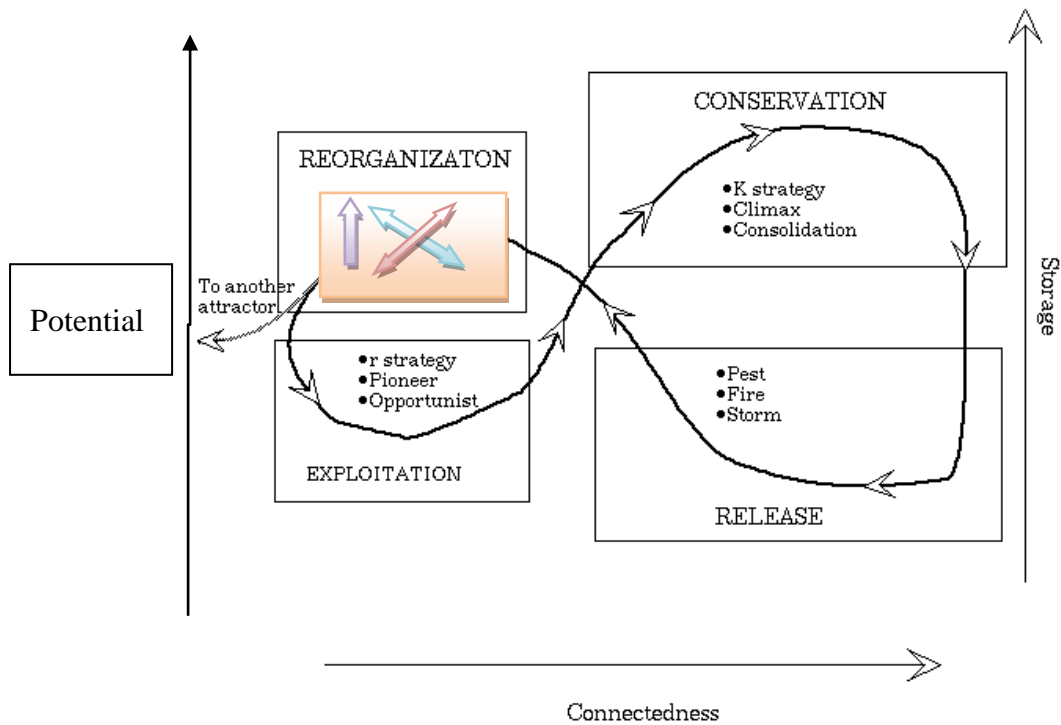


Figure 8.6 Conner's (2014) schema of interactions between intentions and choices on engagement in evaluative constructivism positioned into the Reorganisation phase of Holling's (2001) ACC.

In the panarchy system the intentions-choices upper parts of the arrows are fed by the wisdom from the teacher that Holling (2001) refers to as *remember* in ecological systems (Holling, 2001) that arrive from outside the adaptive change cycle. The teacher provides not only information but the reflective tools to assist the learner to see their way out of the reorganisation phase through engagement. These reflective tools could be guidelines, questioning protocols, or mnemonics in the form of process prompts, which enable students to see their potential and capacity (Conner, 2014).

Potential in the ACC and Choice in Conner's Evaluative Constructivist Model

The purpose of this section is to show the overlap between the choice of strategies for learning in evaluative constructivist model and potential in the ACC. In the first part I draw analogies between fertile ground in the forest example and potential/storage and followed by choice.

In the recovering forest example, the left hand side of the ACC potential refers to the potential for change – the options open to the systems provided by the disintegration of complex molecules and the release of nutrients available for decomposers. Holling's earlier models represented potential as storage, which in the forest example relates to the availability of nutrients and this gives the system a high potential for change, and creates an environment favourable for incoming propagules. As the system progresses from Reorganisation to Exploitation and the new arrivals establish themselves the potential for change declines only to increase as the system establishes itself and there is a build-up of forest fuel.

I now look back at the forest example for analogies between potential in the ACC and choice in the evaluative constructivist classroom. In the forest the availability of nutrients creates fertile ground or space for creativity for new species combinations and assortments derived from incoming propagules of new and returning species which will take advantage of these resources. The readily available nutrients and the fertile ground that they bring, in the classroom context, could be thought of as an emotionally cognitively positive situation that allows the learner to create using new information brought in from outside the system in combination with their own pre-existent resources. In such a space students are free to question themselves and others – free and safe from ridicule to be original and creative.

The variety of means by which available nutrients are exploited in Nature can be seen as parallel to the means used by the learner to assemble ideas into a coherent idea-complex, or essay. That is, the means by which an individual organism or a community is assembled. Starting with community assemblage I believe will provide a fruitful metaphor for ideas assemblage. Bearing in mind that a community in an ecosystem assembles itself around attractors of biotic and abiotic factors (ecological filters) and to use Capra and Luisi's (2014) metaphor the ecological filter in the humans are their biological and culturally determined personal boundaries that function like a semi-permeable membrane – letting some things in and excluding others. In the classroom context, the teacher, who makes students aware of the scope of means by which they can exploit incoming information and resolve a problem is analogous to an ecologist scoping out the full extent of the attractors over a recovering terrain (Kay, 2000 for his concept of the qualitative work of ecologists working out SOHO systems). The teacher in the evaluative constructivist classroom furnishes the student with a qualitative map of how to assemble the information into a coherent form, in a process similar to that where an ecologist would scope out post fire recovery patterns, given factors such as soils, geology, slope, aspect and microclimates. To carry the metaphor further, and to reinforce it,

the so-called site recovery map could be thought of as range of abilities both culturally and biologically derived as possessed by the individual learner.

A species or community that proves successful will be one that is able to survive and thrive within the constraints provided by the terrain in which it finds itself. Similarly an idea or idea-complex will also be successful if it too is able to use affective resources effectively and meet the demands of the learning intentions or goals. For a learner to decide which method or approach to take to meet the teacher's challenge requires evaluation and reflection. This is the period of sorting before the system enters the Exploitation/Growth phase of the ACC, and this phase can be thought of in terms of choosing the most appropriate way of learning, or the most useful way of learning.

In any ecosystem the vertical axis of Holling's ACC refers to storage of fuel, whether actual or metaphoric, and it is also represented as a potential for change. The back loop rises during its progression to the left because, to use the forest recovering from fire as a metaphor, more and more nutrients are released during decomposition by heterotrophs. Gradually, as all the nutrients contained in the ash are liberated, the system of decomposition will collapse and the system enters the Exploitation phase where these nutrients can be used by autotrophs (see Figure 8.6). So in the classroom situation what metaphor can be drawn from this ecosystem recovery phase scenario? Heterotrophic collapse could be thought of as a metaphor for the point where the student, after much discussion and deliberation, is ready to write and is therefore ready to begin the production of the first draft. The student no longer requires the affective support of the teacher or peers because all has been released and is ready for exploitation in the assemblage of her ideas. Once the first draft is made dramatic changes in what is written are unlikely because the student is now set on a course of action.

In this metaphor the learning experience that occurs during an assigned project from beginning to the completion of the finished work, is treated as one complete ACC. This is also the approach taken by Stanger et al., (2013) and it was the way each lesson and the overall course in case study of School #1 was treated.

'Engagement'

Engagement rises with increasing choice and intention. Engagement in the ACC could be thought of as the ecosystem's commitment to movement out of the Reorganisation phase toward exploitation. In Conner's model engagement runs vertically parallel to potential in

Holling's ACC model. Engagement in students implies readiness and commitment for action. This can be seen as a metaphor for the potential for change and the storage of nutrients in the forest recovery example.

Potential in the ACC and Intentions in Conner's Evaluative Constructivist Model

The purpose of this section is to show the overlap between intentions in the evaluative constructivist model and potential in the ACC. For the example here, intentions refer to the curriculum learning content goals and these relate to the arrival and selection of ideas, information, and memes. As I have already developed in the above sub-section where potential is discussed in relation to choice, once ideas are deposited into a framework, whether that is r-selected pioneering species in the forest example, or, in the classroom context, a student begins formulating an idea, and writing, then the potential for change tapers off.

Connectedness in Relation to Engagement, Intentions and Choices

During the Reorganisation phase of the ACC connectedness is at its lowest. In the minds of the individual and in the collective mind of the learning group the ideas (intentions) are being chosen and the methods (choice) to assemble them are being sorted and evaluated by the students. At this point connections have not been made but students may have a hunch as to how they will fit their ideas together. No commitment to one idea or method has yet been made and thus the potential for collapse is low because no structures have been built at this point. In the forest example, however, the potential for collapse of the bacterial decomposition system and the ongoing release of nutrients is imminent once all the nutrients stored in ash and burnt debris has been exhausted. This form of collapse could be thought of as an exhaustion of the supply of affective and material resources and in the classroom context it is parallel to the resources offered by the teacher for the completion of the initial phases of the task, which indicates a turning point in the students' work, because they must stop sorting and being assembling. As has been mentioned above, the student is open to the possibility of being drawn to another system where there is another attractor (see Figure 8.4). In this sense there is a relatively high potential for change. Connectivity will not begin to increase until selections of ideas and methods have been made and construction of a course of action can commence thus entering into the Exploitation/growth or 'r' phase.

The relationship between choice, intention, and connectedness could be thought of in terms of the scene described by Hemingway (1922) in *The Big-Two Hearted River* on the pine and fern plain. Where there are islands of pine and sweet fern in amongst the charred soil:

He stood with the pack on his back on the brow of the hill looking out across the country toward the distant river and then struck down the hillside away from the road. Under foot the ground was good walking. Two hundred yards down the hillside the fire line stopped. Then it was sweet fern, growing ankle high, to walk through and clumps of jack pines, a long undulating country with frequent rises and descents, sandy underfoot and the country alive again (p.136).

Connectivity between the islands is low but occurs through the sea of sweet fern that laps up around the jack pine islands. The fern swards would form corridor of access facilitating the exchange of organisms from pine island to island. If the islands of pines are thought of as intentions on a substrate of choices, which together make up a draft student project or idea-complex, and the sweet fern is viewed as the growing realisation of how the islands of pines/idea-complexes are interrelated, then, metaphorically, the learner can see how each choice is adapted to a specific arrange of intentions or information. Similarly, in the short story, before the arrival of Nick onto the pine plain, when he has been dropped off in the burnout town of Seney, the potential for recovery of the forest ecosystem is present, and there is also the potential for the recovery of the town. Hemingway makes no obvious connections between the elements but the elements are present just understated (see Melling, 2009). The first sign of life the protagonist Nick sees are the trout in the river outside the burnt out town, symbolic of hope and recovery (Balaev, 2014).

Resilience in Relation to Engagement, Intentions and Choice

Resilience to change in the ACC increases during the Reorganisation because of the fall in connectivity. This means that any new or potentially perturbing information introduced is unlikely to upset the student's processing and sorting information and methods of assemblage. As the cycle enters into the Exploitation phase, resilience increases still further. Students are in now an experimental phase of reflection about whether the information they have chosen and the methods are appropriate. Any new information that arrives is unlikely perturb the new system but may be readily absorbed, in a manner similar to the way a new species may find its place in a newly recovering environment.

Summary

Available nutrients in the reorganisation phase of Holling's ACC provide fertile ground for pre-existent propagules such as the seed bank and incoming new and old species that made up the former ecosystem. Taking the notion of fertile ground as a metaphor for the conditions conducive for creativity, that is for the generation of ideas, in the constructivist classroom, fertile ground could allude to affective resources. These could relate to positive, equitable and safe learning environment that facilitates free questioning and exchange of ideas between teacher and learners and beyond the classroom. In other words available nutrients in the Re-organisation phase of the ACC in this section are considered analogous to favourable situated conditional cognition.

The site recovery map showing the full scope of places where certain biological communities would occur post-fire in response to abiotic and biotic elements is analogous to teachers making the learner aware of their patterns of learning ; that is, the teacher scopes out learner's processes or judgements of learning. This is the full range of the learner's choice in Conner's model.

Potential in the back loop of the ACC rises then falls as nutrients, be they biological in the forest context, or information in the classroom context, are released. This metaphor is appropriate in the learning cycle where the students have extracted or been given as much nutrient/information as possible from the system and they are reaching the turning point where deliberation and sorting of ideas is over. It now time to write and to assemble their ideas into a coherent trial, as their first draft. This draft will evolve over time and going through successive stages analogous to a forest succession.

Once all the ideas/information has been placed into the draft framework (analogous to the assortment of r-selected species into their respective niches) the potential for change will fall only to rise again gradually during the growth or exploitation phase of the ACC. That is, maximal comprehension of the learning intentions or the curriculum content, leads to a falloff in potential for change, as well as in the storage of affective resources of classmates and the teacher.

The Three Dimensions of ACC and *The New Zealand Curriculum* Key Competencies

The ACC is comprised of three dimensions: resilience, connectedness and potential, all of which shape the ACC and determine how it responds to disturbance (Gunderson et al., 1995 cited in Holling, 2001). In the next section, I elaborate each of the three dimensions both as to how they relate to ecosystems, and how this can be extended metaphorically to teaching and learning.

To meet the demands of high stakes assessments the teaching of content knowledge is important (Gilbert, 2005; MoE, 2007; Hipkins, 2008). Knowledge is enveloped in the teaching of skills designed to guide students in their life pursuits and for them to become lifelong adaptive learners. These skills are encapsulated in the Key Competencies. The *NZC* identifies five such Key Competencies:

- Thinking
- Using language, symbols, and texts
- Managing Self
- Relating to Others
- Participating and Contributing (MoE, 2007, p. 12)

I propose that there is analogical overlap between the three dimensions of the ACC and the Key Competencies of the *NZC*, whereby resilience has an overlap with managing self, connectedness may be analogous to relating to others and to participating and contributing, and potential appears to overlap with thinking.

Connectedness

The strength of connections between elements within a system moderates the influences of the outside world.

Gunderson & Holling (2002, loc. 367).

In biological, ecological, and economic systems the dimension of connectedness in the ACC refers to the “degree of connectedness among controlling variables” (Gunderson & Holling, 2002 loc.151-156). All controlling variables work in synchrony responding in their own way in co-ordination with each other to maintain constancy in the face of external changes. In the ACC connectedness is a measure of cohesion between elements in a system.

In this section I propose that the ACC dimension of connectedness as represented by the x-axis (Figure 8.6) could overlap with the Key Competencies of relating to others and participating and contributing (MoE, 2007).

In the metaphor of idea formation, connectedness has much in common with consilience and the NZC Principle of Coherence which deals with the extent to which ideas from diverse disciplines are meaningfully connected (MoE 2007) That is, the degree to which ideas contribute to the creation of an innovative solution to a perplexing problem or disturbance. In the instances of relating to others and participating and contributing these Key Competencies could relate to cohesion and exchanges of information and energy in the form of power and affectation. Relating to others is the openness to others with the willingness to learn from one another: “the ability to listen actively, recognise different points of view, negotiate, and share ideas” (MoE, 2007 p. 12). The closely associated competency of participating and contributing involves the suitable group behaviour for making contributions, and to facilitate occasions for idea exchanges between individuals. In this way, there are open channels of connection between participants to allow the free flow of information and energy. Under this competency the students understand the importance of balancing rights, roles, and responsibilities such that in the classroom setting there is a clear understanding of the role of the teacher and the role of the student and that the one learns from one another (see Freire 1970). In this manner, connectedness could be evidenced in the way in which feedback is delivered to help the student navigate the future and complete the task. Participating and contributing also encompasses helping to build the quality and sustainability of natural and social environments (MoE, 2007). This aspect could relate to the awareness of students to social and environmental issues in New Zealand and the steps they would be willing to take to address them.

Low levels of connectedness are associated with weak links and loose associations between elements. These elements tend to be dominated by outside influences (Peterson et al., 1998; Gunderson & Holling, 2002 loc. 367). If we are discussing individual students, they are at time of weak connectedness as it were, carried about by every wind of doctrine. In contrast, high levels of connectedness are associated with the inward relations among elements of aggregates where the relationships deal with the effects of external changes.

Peterson et al., (1998) emphasise that connectedness should be thought of as the strength of feedback mechanisms because of connections with the *other*. This strength of connections

determines how quickly the system will return to a former state after a disturbance; that is, how strong the system can follow its trajectory. Connectedness is thus connections to others and other ideas, as well as the sort of connections that facilitate negative feedback. In this way connectedness is a function of resilience, described above.

Potential

Potential, also known as capacity, and as storage, is represented by the y-axis on the ACC and, in the forest recovery example, is the accumulation of biomass and nutrients on the ACC (Gunderson and Holling, 2002 loc. 151). In the fire prone forest potential is a measure of the accumulation of forest debris and wastes of growth and development such as fuel, and hence the forest's potential for ignition when there is a spark (Holling, 2001). As the system develops the future appears certain.

In an economic system potential takes the form of skills in management, marketing, knowledge, and innovation (Gunderson and Holling, 2002). In the next section I use the term potential to encompass the notions of capacity for change, storage of resources and energy, as well the debris from growth processes (Gunderson and Holling, 2002). In the forest context debris includes the discarded leaves, bark and deadwood of forest growth overtime, whereas in the classroom context the debris could be discarded drafts, study notes, assessments, and lecture notes. In contrast, at the crest of the back loop of the ACC, potential is understood to be the maximum accumulation of released nutrients and opportunities for pioneering r-selected species. Potential at this stage is therefore the susceptibility for colonisation and change.

In terms of teaching and learning, and in terms of the evolution of ideas in the classroom context, potential can be more easily aligned to the economic version of the ACC than to the ecosystem model primarily because it is dealing with the development and learning in a human system. Of the *NZC* Key Competencies, thinking and managing self are the most relevant to the ACC dimension of potential because of the overlap with skills, knowledge and innovation. Note that Managing Self also overlaps with resilience.

Thinking relates to intellectual curiosity. It involves critical thought, metacognition, creativity, to solve problems, make decisions, generate knowledge creation, and make sense of the world. Students who have good thinking skills harvest their own experiences,

intuitions, and ideas (as well as the ideas of others) through questioning and challenging the status quo (MoE, 2007). In this way potential has overlap with connectedness.

Managing self relates to being enterprising and resourceful, establishing personal goals, making plans, and managing projects. Students who manage themselves well possess strategies to confront challenges (MoE, 2007). These capabilities are necessary to navigate away from the confusion and indecision that arises during the Re-organisation or α -phase of the ACC.

As noted above potential collapses at two points during the ACC: in the front loop and in the back loop. Decline in potential in the front loop is through the disintegration and questioning of skills. There may be a momentary loss of confidence in some students in how to apply it so that the new challenge can be met and at this point the role of the teacher (along with students' classmates) to help other students. This intervention would constitute the phenomenon of remember (Holling, 2001).

Decline in potential occurs in the back loop (from $\alpha \rightarrow r$) through exhaustion of available affective resources and available disconnected information and skills required for the creation of untested proposals or solutions. These prototypical and untested innovations are necessary to navigate forward into the future and overcome the challenge that occurred at the peak of conservation (K) and engendered collapse at Ω .

The state of idea formation determines how ready that idea is to collapse. This could be a measure of brittleness of the idea, or how sealed off the learner is to new ideas. Is the idea well defended or are there openings to other ideas? In a class, idea development could be found in the students' use of particular key vocabulary and its collocation. In the subject Year 13 French class at School #1 ideas were first formed in English and gradually translated into French as the students' ideas developed and as crystallised. The final delivery of the idea was presented in error free French in the form of a two minute podcast. Idea development could be measured from a transcript by recording the relative frequency of French to English over periods no longer than the duration of the final podcast.

Resilience

Resilience refers to the system's capacity to bounce back after sudden or unpredictable disturbance, and it is the opposite of vulnerability. Resilience answers the question how much change can a system absorb before it becomes another sort of system (Holling, 2001). If the

disturbance is beyond the system's resilience, the system may be permanently changed, and therefore may switch to a different stable state because it has been drawn away by an alternative attractor.

Resilience keeps the adaptive change process on a course as it passes through the four stages maintaining the general type and shape of system through a process of negative feedback. *Negative feedback* is characterised by oscillation around a goal, for example the homeostatic control of blood temperature in warm blooded animals (Love lock, 1979; Kay, 1999; Capra & Luisi, 2014). So, the cybernetic rhythm is embedded into the ACC maintaining the cycle's trajectory through the four phases.

Resilience is an expression of the interaction between connectedness and potential and is at its lowest when there is maximum connectedness and potential, and conversely resilience is highest when there are minimum connections.

Resilience may have overlap with the Key Competency of managing self through the construction of ideas that reflect openness to change and adaptability. As change is inevitable in the ACC model the best course of action for participants in the system is not to seek an optimal phase on the cycle and remain there, but instead to have a frame of mind that makes one and one's ideas flexible.

Resilience is an expression of the interaction between potential and connectedness. Holling (2001) describes connectedness as the level of controllability of the system. By this he means how rigid or flexible is the system given the number of connections which appear to act as constraints when the system is faced with the need to react and change. Holling (2001) explains that the level of connectedness relates directly to how much self-determination or "destiny" a system has, such that, "connectedness, or controllability, determines the degree to which a system can control its own destiny, as distinct from being caught by the whims of external variability" (p. 394).

Holling's notion of destiny suggests that each $r \rightarrow K$ phase of the ACC is not undesirable or avoidable. This growth stage is a phase that the organism, or in this case the student, must pass through in order to reach a turning point. When viewed in this manner, teachers should be able to respect the destiny of their students having confidence that growth must end in some kind of necessary suffering or pain, as all growth is painful (see Illeris, 2002)

Resilience through connectedness includes regulatory mechanisms that reduce the likelihood of chaotic system behaviour. However, these same controlling and stabilising mechanisms can lead to brittleness and rigidity (Gunderson et al., 2002). High connectedness appears to limit the number of options open to the system and thus restricts the system's freedom to choose. In this way, the level of connectivity can be thought of in terms of the extent to which the links facilitate or inhibit the system's ability to adapt to change, and allow the system to maintain itself autonomously as it progresses through the four phases of the ACC. This includes permitting a system to go through a phase release (Holling, 2001) or the beginning of the phase of creative destruction (Schumpeter, 1950 cited in Holling, 2001). This could entail allowing students to reach conclusions that diverge from that of both the teacher and the syllabus. Further, collapse appears to be unavoidable, but the impact of collapse on the individual can be mitigated through an attitude of openness of the individual and that this attitude should be imbued in the ideas that they create where both the author and the idea are in a state of becoming (Perry, 1970). An idea may be put forward without rigidity also in a state of becoming; that is, open to the necessity of constant innovation and thus rendered adaptable to perpetual perplexing change.

CHAPTER 9

THEORETICAL FRAMEWORK: INSIGHTS FROM ERNEST HEMINGWAY'S *BIG TWO-HEARTED RIVER*

I can make a landscape like Mr. Paul Cezanne. I learned how to make a landscape...by walking through the Luxembourg Museum a thousand times with an empty gut.

(Hemingway cited in Ross, 1961 p. 60)

All the argument and all the wisdom is not in the encyclopaedia, or the treatise on metaphysics, or the Body of Divinity, but in the sonnet or the play.

From *Circles* by Ralph Waldo Emerson (1841)

Research Question 4

What insights about the learning process interpreted using panarchy can be gained through Ernest Hemingway's short story *Big Two-Hearted River*?

Introduction

Slingerland & Collard (2012) propose consilience as a “shared framework of enquiry for the sciences and humanities...science informing the humanistic inquiry, and humanistic inquiry enriching the sciences” (Slingerland, 2014 p. 125).

Literature and visual art are artistic representations of aspects of experience (Dissanayake, 1998) intended to evoke feeling (E.O.Wilson, 1998). For Rosenblatt (1993) literature can be read on a continuum that spans from the *aesthetic* to the *efferent*. During an efferent reading the reader seeks to comprehend just what is written; it is a reading for facts. An aesthetic reading on the other hand involves awareness of the feelings and associations that the text evokes. Under Rosenblatt’s (1956/2005) “transactional theory of reading” each reading is a new event for each individual where both reader and text are mutually changed. The transformation may occur through a vicariously lived experience where the printed words become emotionally engaging and meaningful.

A story or poem or play is merely ink spots on paper until a reader transforms them into a set of meaningful symbols. When these symbols lead us to live through some moment of feeling, to enter into some human personality, or to participate imaginatively in some situation or event, we have evoked a work of literary art. Literature provides a living through, not simply knowledge about: not information that lovers have died young and fair, but a living-through of Romeo and Juliet; not just facts about Rome, but a living-through of the tensions of Julius Caesar or the paradoxes of Caesar and Cleopatra. (Rosenblatt, 1956/2005, p. 62-63)

The associations or connections evoked through the living through another’s life by a work of fiction may have unexpected and unpredictable heuristic value for the researcher of a particular discipline (Rosenblatt, 1993). Readers from the arts and sciences interested in human origins, human nature, brain function and in particular education may acquire insights from literature and, visual arts (Roberts, 2012; Freeman-Moir, 2013¹, Zeki, 1999, 2000;

¹ In September 2013, at the Symposium of the Arts and Education research held in the College of Education at the University of Canterbury, Peter Roberts and John Freeman-Moir recommended and encouraged the use of literature and visual art in education research.

Young, 2000; Domasio, 2003; Royal Society of New Zealand, 2010; Dutton, 2010; Rosenberg, 2011; E.O.Wilson & Hass, 2014)².

No detail in Hemingway's work is random (Dimock, 2014). It is all worth our consideration and contemplation (Lamb, 1991). In this section I draw on Ernest Hemingway's short story, *Big Two-Hearted River* as a source of insight into the teaching and learning process. The story is apt for my research purposes. First, *Big Two-Hearted River* recounts a solo trout fishing trip into a forest environment after it has been destroyed by fire. The protagonist Nick has recently returned from World War I and is suffering post-traumatic stress. The destruction and subsequent ecological recovery process of the forest reflects Nick's own feelings of destruction and recovery (Schmit, 1990). For me his experience recalls the four phases of the adaptive change cycle (ACC) and panarchy. Second, Hemingway transposes many of the techniques developed by Paul Cezanne for painting into writing (Ross, 1961). In this way, the story offers both literary and visual art resources on which to extract insights into the learning process. Furthermore, Hemingway's use of the techniques in contemporary painting in his writing created a style of literature that was consilient with the contemporary art of his period.

This first section describes key insights I have drawn from an examination of a sample of the academic literature that interprets Hemingway's short story. I have then transposed these interpretations into the context of teaching and learning as it relates retrospectively to my case study at School #1. I begin establishing the clear symbolic relationship between ecological succession in fire prone forests of North America and the setting of *Big Two-Hearted River*. With this established I indicate the metaphorical overlap with the teaching and learning process. I then outline the simple notion of the writing process as analogous to fishing. As Nick leaves the town of Seney the most conspicuous life form in the blackened wasteland are the blackened grasshoppers. Following on from this, I discuss the symbolism of the grasshoppers in relation to the permanence of trauma-induced change, adaptability and the retention of knowledge. I then draw on Hagemann (1979) and her analysis of Cezanne's *Cour de ferme* (1838) and Hemingway's writing style. I examine Hemingway's transposition of three techniques Cezanne developed that depict what is really happening. The first

² See Rothenberg (2011) for a discussion and an alternative view of the role art has played in advancing science.

technique is tension created through the interdependence of elements that are being pulled apart by a brooding force. I relate this to the tension between case study participants, as well as the tension that exists between the necessity of play in teaching and learning in relation to the pressure to eliminate play and focus on success in high stakes assessments.

The second technique involves the containment of these elements and tension through the positioning of large forms on either side the work of art that draw the viewer's attention to the interior of the work. I relate this to the ACC which predicts that the optimal place for adaptability is between the confusion of reorganisation (α -phase) and the rigidity conservation (K- phase) and shock of collapse (Ω -phase). Put simply, the productive, adaptable and changing state of the early stages of recovery and growth of the r-phase is the place where Nick recovers.

The third technique is omission. This is where essential detail is deliberately left unsaid. Hemingway's story not only deliberately omits the Great War but also the Native American: both of which play roles in the story. The theme of *Indianness* refers to ecological thinking and its implications, as well as the historic backdrop of the Anglo-American and Native American struggle. This parallels the role Maori language (Te Reo) and culture have at School #1, yet few Maori enrol at the school because of the high fees.

Additionally, I consider image and desire of Nick to hold steady in the current as a metaphor for co-evolution and the learning experience of students.

I conclude with a review of the main points and insights. In the last subsection of this chapter I make recommendations for the place art could have in informing education research.

Fire Ecology and Teaching and Learning

As has been established in this chapter, the natural destruction of a forest ecosystem during a fire can be a creative event necessary for the ecosystem to maintain health and adaptability (Franke, 2000). The setting of *Big Two-Hearted River* is the protagonist's progression through the phases of ecological succession from the wasteland of the charred earth where even the soil in the town of Seney has been burnt off, to the emergence of pioneering jack pines and fern to deciduous forests which represents the K-phase of the ACC. The forest

recovery symbolises and mirrors the protagonist's destruction that suggests the Ω -phase in the panarchy analogy, and suffering and struggle to recuperate represented by the α -phase. The jack pine stage represents the r-phase of the ACC, and these hardy trees are of symbolic importance to the story as Schmit (1990) suggests. Jack pines (*Pinus banksiana*) are among a species of conifers that require fire to reseed. Seed cones can stay at top of trees for up to 25 years waiting for fire. High temperatures are required induce cones to open and release their seeds which are able to germinate in mineral soils with little organic matter. The jack pines operate as nurse species, creating shelter, restoring soil nutrients and moisture thus creating an environment that facilitates the colonisation of less robust species such as red pine and hardwoods, and also the colonisation by the Kirkland Warbler which only nests in stands of jack pines. Schmit (1990) argues that the jack pine symbolises the necessity of destruction in order to achieve renewal, growth and maturity:

The jack pine forest will reclaim the burned land. Similarly, Nick's discipline of control will grow over the harsh experience of the war. Indeed, war may have been a necessary "fire ecology" to mature him. As jack pine rise out the burnt plain, so Nick will rise out of his emotional pain (p. 143).

In many ways it can be argued that upsetting events are a necessary part of human development and maturity. That is, such events trigger disequilibrium and recovery through accommodation (Piaget, 1950). This notion is encapsulated by the saying, "A single spark can start a prairie fire" (Ayers, 2006). Of prairie fires Ayers explains that:

[they] are not always catastrophic; they can be, as well, naturally occurring events, necessary and renewing, removing the thick mat of thatch that suffocates life, releasing the seeds while encouraging the birds and the insects and the other animals, all the flora and fauna, opening and crawling, transforming and lurching to life (p. 17).

For Ayers, the prairie fire maps perfectly on teaching because "teachers strike sparks within every student every day", but do not know how this spark will be received nor what the effect on the student will be (Ayers, 2006, p. 17). Given the closeness of the prairie or forest fire metaphor to teaching, Hemingway's short story can serve as a heuristic artistic representation (that is, a source of insights) for transformation and healing that should have overlap with the

transformative learning process. In fact, Hemingway's short story has wide emotional appeal for the reason that the transformations in a fire prone forest mirror those of dramatic change and recovery in human life. As Berman (2007) explains:

Forest composition is generally dynamic, showing both "growth and decomposition". It is a visible source of evidence for the stages by which life passes into death, and, for the return of life as well. One of the reasons why *Big Two-Hearted River* is emotionally effective is its regeneration of both man and scene (p. 42).

Fishing Is a Metaphor for the Writing Process

Fishing is used as a metaphor for writing. The rushing river is the writer's life; downstream it is his memory of the past, upstream the future, and where he stands the present (Lamb, 1991, p. 178).

The fish symbolise stories, the river the life of the writer. Writing is incremental and Nick's progress up the river also; he waylays in islands of pines, hits and misses, is overwhelmed by a giant trout which represents overly ambitious writing and suffers disappointment as Lamb (1991) explains:

The trout are stories that he fishes for in his memory, and the success of both the fisherman and the writer depends upon his luck, talent, and discipline. The giant trout that gets away...represents the kind of fictional ideal he is working to achieve, something he can but glimpse since he does not yet possess the artistic ability to catch it (Lamb, 1991, p. 178).

Pursuing that which one does not have the capacity, luck, talent, to succeed, can only result in disappointment. Such a scenario is reminiscent of a teacher imposing a task beyond the resources of the students or a learner choosing a project that they can never complete. The result is potential damage to self-esteem with a lack of achievement. Such a predicament is reminiscent poverty trap that can occur in the reorganisation phase of the ACC.

In one of the original, but rejected endings of the short story, Hemingway finishes the story with Nick full of promise and expectation that he has something to write. His experience up the river, the successes, and his refraining from thinking and speaking enabled him to sort of

the mess in his head. His decision to avoid the swamp, and stay within his limits led to promise and the road to recovery (Lamb, 1991).

Consciousness and Nick's mental health are mirrored in the ecological state of Seney (Johnston, 1984) and Nature itself (Balaev, 2014). In this short story, Nick develops and questions his self-knowledge and his knowledge of the world while in Nature that is both ever pervasive and inescapable. As Balaev (2014) notes:

The sameness of the observer and observed suggests a continuity between humans and nature—the individual may be outside of society but he is not outside of nature. (Balaev, 2014, p. 110)

If indeed Nature is ever pervasive, is it ever necessary to leave the classroom?³ The ACC is the underlying natural pattern that permeates all and even the artificial - there can be no divorce from Nature and no Education Outside the Classroom because the pattern is ubiquitous and carried within us. Hemingway puts the protagonist, and therefore mankind in general, in his place. He shows that Nature does not admire men as we admire Nature, (Balaev, 2014) nor does Nature care about our wellbeing. The message is that we are, in spite of our prowess as a species, part of a whole ecosystem not a dominating force (Balaev, 2014). The implications for analysis of the case study from the point of view of the panarchy also sees each individual learner as embedded in nested cycles of a myriad of scales that no one can dominate, one is simply part of the whole.

Grasshoppers – Impermanence of Change and Adaptation

As Nick leaves the obliterated town of Seney across the bridge and onto the scarred blackened pine plane, he notices grasshoppers now blackened, not through a coating of ash, but are now genetically black. He examines one that has crawled on to his sock and he wonders how long they would stay that way. The dark colour of grasshoppers is known as a “homochromic response” and common in many species where they adapt their colour to

³ See Louv (2008) and Giesbrecht (2012) for a discussion of the necessity of outdoor play in child development, cultivating empathy and stewardship for Nature. See Louv (2008) for innovative means to entwine indoor classroom activities with experiences of Nature.

match the substrate and may occur in burnt sites, where dark individuals predominate (Rowell cited in Hochkirch et al., 2008).

As he smoked, his legs stretched out in front of him, he noticed a grasshopper walk along the ground and up onto his woolen sock. The grasshopper was black. As he had walked along the road climbing he had started many grasshoppers from the dust. They were all black. They were not the big grasshoppers with yellow and black or red and black wings whirring out from their black wing sheathing and whirring as they fly up. These were just ordinary hoppers but all a sooty black in color. Nick had wondered about them as he walked without really thinking about them. Now as he watched the black hopper that was nibbling at the wool of his sock with its fourway lip, he realized that they had all turned black from living in the burned over land. He realized that the fire must have come the year before but the grasshoppers were all black now. He wondered how long they would stay that way. Carefully he reached his hand down and took hold of the hopper by the wings. He turned him up, all his legs walking in the air, and looked at his jointed belly. Yes, it was black too, iridescent where the back and head were dusty. "Go on Hopper," Nick said, speaking out loud for the first time, "Fly away somewhere." He tossed the grasshopper up into the air and watched him sail away to a charcoal stump across the road (p. 135).

The passage evokes the themes of adaptability and the permanence of change in the face of trauma. Nick may see the grasshoppers as representations of himself the traumatised soldier as the blackened grasshoppers that have survived the devastating conflagration (O'Brien, 2009). The question of the permanence of change and adaptation comes as Nick wonders how long the grasshoppers would remain black. This raises the important issue of the impermanence of experience and learning that recurs as a theme in other Hemingway writings and is of importance in considering the longevity and retention of knowledge delivered in a constructivist classroom. Severely damaged ecosystems are never the same as before once they have recovered. Some may return to a former state in general, others may be drawn away to other attractors.

The final two sentences of the passage are revealing and may foreshadow the final conclusion of the story. Nick is surprised that the blackness of the grasshoppers is deep and appears

morphological. He releases the hopper tossing it into the air and speaking for the first time commanding it to “Fly away somewhere”, however, it does not fly far but lands on a burnt stump close by. It is possible that the grasshopper represents Nick’s shocking realisation that his trauma is not superficial but as deep and permanent as the grasshopper’s colour. This suggests that Nick’s trauma that is deep within is evident, and cannot be masked.

Consequently, not unlike the grasshopper, Nick is no longer adapted to the colourful world that existed for before his trauma but must remain in a wasteland.

This notion of the permanence and depth of change provoked by trauma is recalled in the final passage of the story. Here Nick follows the river upstream that leads him to the swamp. It is too dark and there are too many overhanging branches to fish properly and therefore he decides to avoid it. The motif of blackness of the charred landscape and the darkness of the swamp, at the furthest reaches of the river, act to contain the story. In so doing the reader’s attention is focused on the action that occurs in the middle ground. Hemingway’s positioning of the black motif at the opening and closing of the story represents the technique of containment that he derived from a close study of the compositional technique of Cezanne (Hagemann, 1979).

Hemingway and Cezanne

Hemingway had one central ambition and a secret method of achieving it. His desire was to write “one true sentence” to capture “what is really happening”: that is, “things in the making”, and in so doing to write in what was a brand new way (Hagemann, 1979, p. 90). Hemingway referred to this technique using the French verb *constater* (to notice/to observe) (Flora, 1989). Building on the discipline and constraints of newspaper journalism, he would achieve this through close study and contemplation of the works of Cezanne (Ross, 1961; Hagemann, 1979; Johnston, 1984). The result was writing that was built on the structure of a painting and a stripped down minimalist style (Flora, 1989) with few adjectives and potent imagery.

Hagemann (1979) identifies three techniques that Hemingway appears to have transposed from Cezanne. I illustrate these techniques them drawing on Hagemann’s study of Cezanne’s

Cour de ferme (1837) (Farm courtyard) (Figure 9.1) and my interpretation Hemingway's *Big Two-Hearted River* as guided by Hagemann.

Hagemann (1979) breaks down the Cézanne's painting *Cour de ferme* (Figure 9.1) into interconnecting and interdependent static planes (planes that are parallel to the viewer) and dynamic planes (planes that at angles to the picture). Planes can be given tension by shifting one of the vertical sides outwards and away from its opposite vertical side pulling taught the top horizontal line that joins them. Tension between planes can be created through devices that cause the eye to dart between planes.

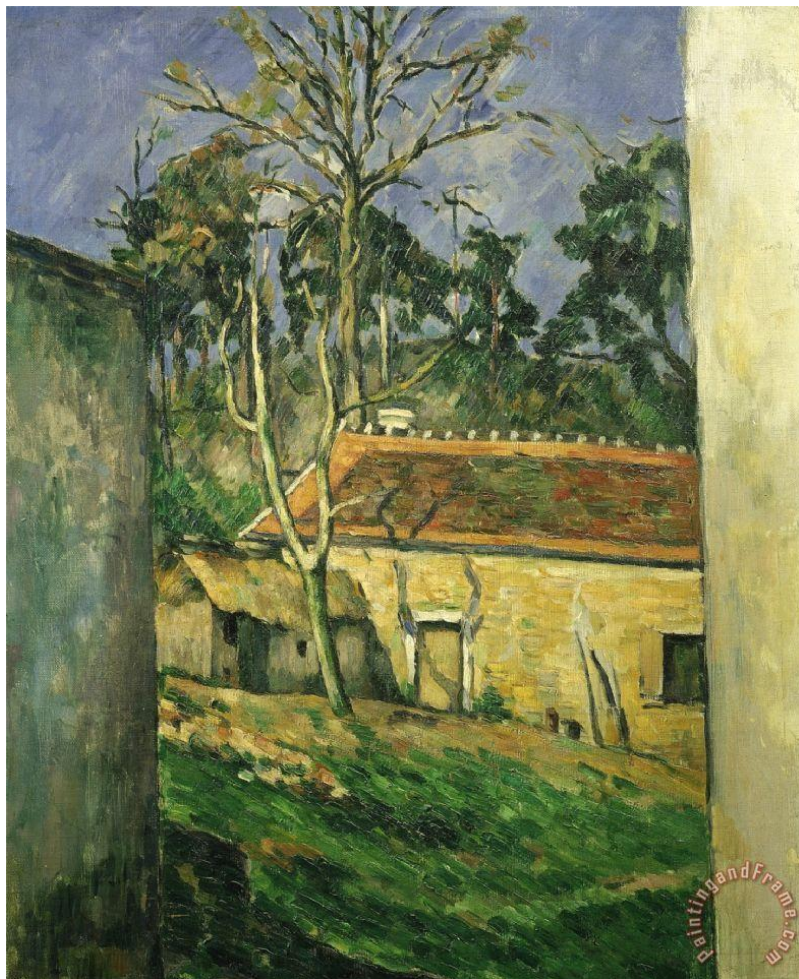


Figure 9.1 *Cour de ferme* by Cézanne (1839) Musée d'Orsay, Paris

Technique 1: The Transformation of Empty Space by Creating Tension between Two or More Planes

Cezanne gave banal reality depth. He did this through the use of intersecting geometric forms that are positioned in such a way to create an internal tension (Hagemann, 1979, Figure 9.2). In the following passages I summarise Hagemann's analysis of *Cour de ferme* and the connection to Hemingway's writing technique.

The static plane of the central red roofed house draws the viewer into the scene across the grassy area of the courtyard (C). The eye is then drawn back out to the two large undefined forms on either side of the picture. One looks back and forth from the right hand yellow form (A) to the darker one on the left hand side (B). Plane A appears to be tiled inwards towards the middle of the picture and emerging from the right hand side of the canvass and invites us in towards the grass plane of C. In addition, if one imagines a line connecting the large tree behind the farmhouse to the left hand side of A, we have another dynamic plane that traverses C. To my eyes this plane, E, contains internal tension. The inner vertical side leans away from the tree pulling, as it were, the upper horizontal line taught (see Figure 9.2), and gives the impression that plane A wants to be closer to the grassy plane C. Dynamic plane D can be imagined from the right hand edge of B and the tree also leads us to the grassy areas of plane C. Hagemann (1979) considers that the C plane draws the viewer to look at smaller details, thus making what she considers a negative space into something vital. In this way Cezanne transforms empty negative space into something positive and alive.

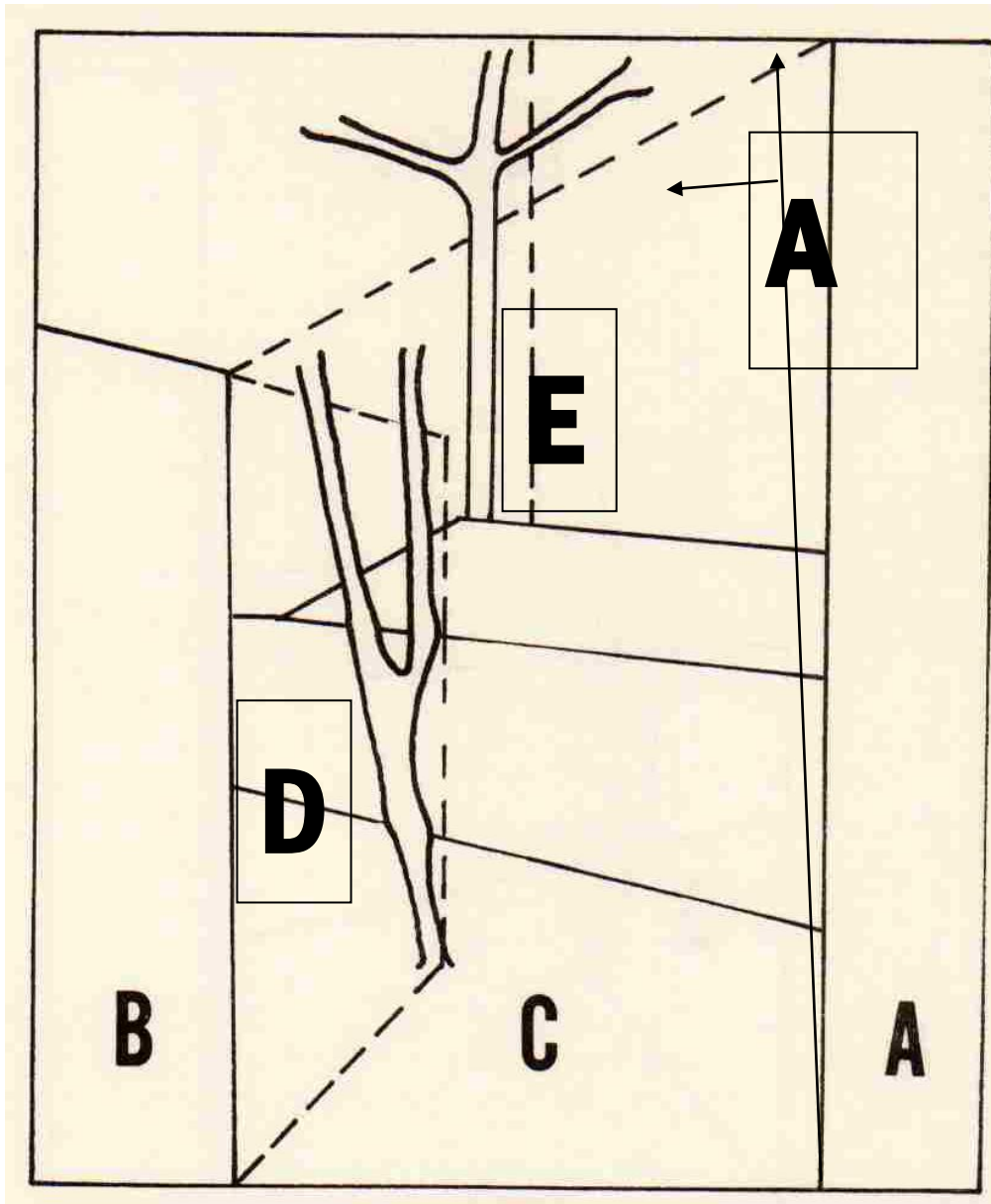


Figure 9.2 The arrangement of static and dynamic planes in Cezanne's *Cour de ferme* modified from Hagemann (1979, pp. 93, 94 & 97)

Similarly, Hemingway populated his stories with characters that are emotionally dependent on one another and yet drawn apart by some other force (Hagemann, 1979). For example, in *Big Two-Hearted River*, there is tension between Nick and the animals he observes. Nick is an admirer and lover of Nature that is both indifferent and uncaring (Balaev, 2014). At the opening of the story Nick spends some time watching the trout and a passing kingfisher⁴ from the Seney Bridge. The playing fish and the kingfisher satisfy Nick. Melling argues that Nick's delight demeans the animals for thinking they are at peace when their lives are strategies for hunting. Melling argues that such play recalls the battle strategy of *ruse de guerre* and the Ojibwa massacre of the English that occurred in the Seney region in the late seventeenth century of which Hemingway must surely have given Nick awareness (Melling, 2009). Ojibwa warriors pretended to play outside the fort to reduce the vigilance and allay the suspicions of the English soldiers. Melling's (2009) notion of *la ruse de guerre* is a reminder of the tension between the developmental purposes of play in the child as a preparation for the seriousness of adult life in contrast to the fun derived from play. Stegelin (2005) discusses the purposes of play; Lauer (2011) discusses the negative consequences of play deprivation because of the notion that play is unproductive and overridden by high stakes assessments; Giesbrecht (2012) discusses the benefits of outdoor play in developing a sense of connection to Nature and creative thinking skills; Louv (2008) writes about the impact of outdoor play deprivation of disconnection to Nature and D'Angour (2013) explains Plato's view that play in child development is necessary, though he is ambivalent about its role in adults. Nick is unlike any other creature is an integral part of biodiversity. He both needs to consume biodiversity to survive but must not over consume lest he deplete the resource. As discussed above, to my mind, there is tension between the grasshopper and Nick. Nick finds the change of colour of the grasshoppers curious and odd. It appears hard for him to accept that he is also blackened by his trauma both in his fragility as he struggles to cope with the disappointment of losing the large fish and that the trauma runs deep to his core as he contemplates and fears the swamp. This attraction and repulsion is reminiscent of the human dilemma of being both a social animal and yet intrinsically selfish (Dawkins, 2006; E.O.Wilson, 2012). Evidence

⁴ Schmit (1990) suggests that Hemingway pays tribute to T.S.Eliot's poem *The Wasteland* and the 'Fisher King' with this reference to the kingfisher.

from the data set from School #1 suggests that the teacher and students are themselves engaged in a similar social dilemma.

Technique 2: Containment of the Tension between Planes

Cezanne's work contains tension between unclear static shapes that seem to keep work vitality while maintaining the viewer's focus on the interior of the artwork. See planes A and B (Figure 9.2). Similarly, Hemingway contains the action in his short story between the blackness of the charred landscape at the beginning of the story and returns to darkness in the form of the swamp at the end. The protagonist is drawn back to the green landscape where he can continue to fish the river with its vistas distant mountains, fields of sweet ferns, and sheltering coppices of jack pines. This act of containment entices the reader to focus on and contemplate this emphasised space.

There are for me two aspects that emerge from these framing spaces. The imaginary recovering landscape that Hemingway describes in *Big Two-Hearted River* possesses characteristics of savannah. In Lesson 3 (Appendix 1) of the Unit of Work, developed as stimulus material for the participants at School #1, students consider their ideal landscapes and the "savanna hypothesis" (Orians & Heerwagen, 1992). According to the hypothesis humans are predisposed to prefer landscapes that recall the primeval human habitat the African savannah (Orians & Heerwagen, 1992; E.O.Wilson, 1998; Dutton, 2010).

The other aspect to emerge is the bucolic space that Hemingway paints is the place where Nick can focus on the business of being and doing. Hemingway does not permit Nick's mind to drift either into the past, symbolised by the charred landscape of Seney, or to the future, as represented by the swamp. In a sense Hemingway suggests that the trauma Nick endured has coloured and shaped his interior self. The structure of this containment suggests an image of a concentric rings (Hagemann, 1979) with the outer most a blackened periphery, a green and blue middle ground and a dark interior.

In terms of panarchy, the middle ground of the bucolic recovering pine forest would be in the successional growth stage or r-phase. Nick's trauma could be represented by the release or collapse or Ω -phase symbolised by the forest fire. The swamp may be thought of in terms of the period of confusion, doubt and fear that characterises the period of healing and

reconstruction of the reorganisation or α -phase. The panarchy analogy suggests that the optimal place for consilience thinking for a sustainable future is where humans are adaptable r-selected generalists as is characteristic of species that inhabit the transitional habitats between disturbance and ecosystem recovery.

For example, L5 exhibited this kind of adaptability in her podcast (Extract 13, Figure 6.1, Chapter 6, Appendix 8). She argued that her damaged to national prided caused by the exaggerated claims in the 100% Pure NZ advertisement and damaged to the environment and could be remedied through innovative conservation projects. Through the choice of this topic she exhibited a willingness to effect change by denouncing publicly the inconsistencies in the government advertising.

Technique 3: Omission – The Iceberg Technique

Cezanne deliberately omits surface detail in spatial planes that renders them unfamiliar, pure, and powerful (Hagemann, 1979; Johnston, 1984)⁵. In *Cour de ferme* Hagemann argues that the nebulous plane A and B contain the picture and with the interaction s of the other planes D and E draw our attention to the amorphous plane C. In this way the painting contains no dead space. Hemingway's theory of omission operates in a similar fashion. It paradoxically leaves out detail in order for it to be included. That is, to include the unstated to convey a mood or implication. Hemingway alluded to this technique as being likened to an iceberg (Flora, 1989). The character David Bourne in Hemingway's novel *Death in the Afternoon* succinctly describes this method of writing:

If a writer of prose knows enough about what he is writing about he may omit things that he knows and the reader...will have a feeling of those things as strongly as though the writer had stated them. (p. 192)

There is a link between the technique of writing and the reality of Nick's condition in that to maintain his composure he must keep the history of his wartime trauma and all history at bay (O'Brien, 2009), as Hemingway explains, quoted in Johnston (1984):

⁵ This is particularly noticeable in Cezanne's use of the white blank page in his watercolours (Johnston, 1984).

“*Big Two-Hearted River* is about a boy coming home beat to the wide from a war,” explained Hemingway. “Beat to the wide was an earlier and possibly more severe form of beat, since those who had it were unable to comment on this condition and could not suffer that it be mentioned in their presence. So the war, all mention of the war, anything about the war, is omitted” (p. 30).

Melling (2009, p. 49) argues that Nick’s solo fishing trip is a moment where he comes into contact with “Indianness in which insects, fish, trees, and water are part of an ancient ecosystem that preserves and regenerates indigenous life.” For Melling (2009), Indianness includes the ethnic conflict between Anglo-American and Native American. Melling (2009) explains that the historic back drop of the Seney setting is the Great Swamp War between the English and the Ojibway. Hemingway writes so that Nick senses it, and senses the Indian presence but does not let them touch him – does not let himself venture beyond the immediacy of his primary five senses. The ever present swamp in the story symbolises for Nick the parts of memory and consciousness of history where Hemingway does not allow Nick to venture simply because he has neither the skill to fish it, nor the skill or constitution remaining to deal with such complex matters that will only entangle him. There is here a reminder of the poverty trap of the ACC.

The story has an Indian name but no Indians are explicitly present. The unseen Indians, and the effects of the war are “the hiddenness in the landscape” (Melling, 2009, p. 46). The conspicuousness of Indians by their absence is of relevance to the case study at School #1. Students attending School #1 are drawn from areas of the least socioeconomic disadvantage and rated as Decile 10 on a scale of 1-10 (ERO, 2010a). In 2010, Maori at School #1 represented 5% of the school roll (ERO, School#2 Review, 2010a). The name of School #1 is in Te reo Maori although Maori students are, not unlike the Indians in Hemingway’s short story, conspicuous by their absence. By comparison in the same year at another local high school, also with a Maori school name but Decile 2 and co-educational Maori represented 29% of the school population (ERO, 2010b).

Maori in comparison to non-Maori exhibit poor mental and physical health, high levels of poverty, high rates of incarceration, high rates unemployment, and they are more likely to be employed in lower paying jobs (Bishop, 2012). In regards to education, Maori are more likely

to leave school without a qualification, are over represented in lower stream and special needs classes, and are less likely to enter tertiary training in comparison to non-Maori. Despite some success in the last ten years, concerted government efforts to lift Maori achievement in education have not managed to redress the disparity (Bishop, 2012).

Melling (2009) sums up the situation succinctly in the context of Nick on the river, and these ideas can be applied as a spill-over into the context of School #1, and the "...social, economic and political disparities..." that exist in New Zealand between the Maori and the other New Zealanders:

At the heart of the story lies a central contradiction: Hemingway wants the Indians involved "in" the life of the river, but the peace Nick Adams searches for depends on their continued exclusion (p. 48).

In a similar way, Maoriness is an integral part of School #1 is fully engaged in the promotion of Te reo Maori, awareness of Maori cultural values and the principles of biculturalism, but it is in a school where Maori appear to be underrepresented. The students L4 and L5 echo this situation in their comments in their questionnaires. They find Maori culture "cool" but feel detached from it.

Lesson 5 of the Unit of Work prepared for the case study at School #1 compares a Maori and French view of sustainability as stimulus material for students (Appendix 1). Both L4 and L5 demonstrated an understanding of the overlap between the holistic world view in sustainability and Maori notion of whakapapa which may translate as genealogy and interrelatedness of all things. L5 stated that the talk with the Maori representative on the Maori spiritual values of Quail Island caused her to rethink her established views about New Zealand. However, L5's feelings about Maori culture did not change during the unit. She considered the culture of the Maori "cool", but she said that it "[d]oesn't have a lot to do with me". Evidence showed that L4 learnt the connection between pre-modern world views in French medieval society and the connection with the Maori world view, but stated that this is not new to her. L4 declared Maori culture to be a "cool" part of New Zealand culture but she felt "...it's slipping away." Her comment related to the difficulty of the language and that the language is said to be "dying out" (Student profiles Appendix 8).

Holding Steady in the Swift Current and the Red Queen

The river in *Big Two-Hearted River* symbolises life and living vitality (Johnston, 1984). In the opening passages Nick stands on the Seney Bridge overlooking the river and observes the trout holding steady in the current:

Nick looked down into the clear, brown water, coloured from the pebbly bottom, and watched the trout keeping themselves steady in the current with wavering fins. As he watched them they changed their positions by quick angles only to hold steady in the fast water again (p. 134)

The trout appear to maintain a constant position through a system of feedback; that is, through a cybernetic rhythm, and this is metaphorically just what the character Nick has to do in Hemingway's story. Unlike the trout which are capable of breaking the current, like the large trout that breaks free and follows the kingfisher into the darker water, Nick cannot venture into the swamp to fish; he is too vulnerable. Hemingway directs Nick to only wish at this point in his recovery to hold steady and he needs all his concentration and might to do this.

The way the trout maintain their position in the stream is reminiscent of the way a duck may remain still on the surface but paddles frantically to remain in the same place. For Lythgoe and Read (1998) the image of the motionless paddling duck is reminiscent of the struggle of natural populations to also remain stationary in the flow of evolutionary challenges (Lythgoe & Read, 1998).

The insight from this passage is that of an association with the Red Queen hypothesis (Van Valen, 1973; Ladle, 1992). The Red Queen hypothesis is named after the passage in Lewis Carroll's story, *Alice through the Looking Glass*, in which Alice realises that in order to stay in the same place she must run as hard as she can. The passage is used as an analogy to describe the situation in which evolving organisms find themselves. They are obliged to reposition themselves to the actions of other populations and adapt to environmental changes, if not they will succumb to the forces of evolution and be rendered extinct. All their efforts are put into maintaining their position, and this means ever adapting to keep ahead of predators and disease that are themselves in constant evolution.

Similarly, in the classroom students must also adapt to survive socially to maintain their relationships with each other and also with the teacher, both of whom are themselves in states of flux. Students are constantly confronted with a stream of experiences that they either assimilate or accommodate according to Piaget's (1950) concept of equilibration outlined in Chapter 3 Theoretical Framework. Gilbert (2005) refers to the Japanese concept of *kaizen*, that is, constant change through innovation necessary to keep ahead of competitors, as a strategy for New Zealand education. This necessity has been translated into an education policy of life-long learning

Summary

Hemingway's short story, together with scholarly analysis, offers a rich source of insights into teaching and learning in the constructivist student-centred classroom. These insights not only inform the development of the theoretical framework of this thesis but also heighten sensitivity to the analysis of case study data. The following are insights gleaned from this analysis of Hemingway's *Big Two-Hearted River*:

- The writing process, not unlike fishing in the short story, is incremental where one builds on previous successes.
- In the short story the most prominent life form on the burnt over pine plane are the grasshoppers. They have turned black, a response of these insects to changes in their substrate. Nick sees their transformation like his own trauma and wonders how long it will last. This raises the question of the permanence of negative experience with case study participants, transformative experiential learning and knowledge retention.
- Hemingway developed his unique style from close study of the works by Cezanne. Hagemann (1979) identifies at least three techniques that she believes Hemingway transposed into writing. I transpose these techniques to an approach to approaching the case study at School #1. The first technique is the interdependence and tension between forms that focuses the attention on and vitalises the indistinct. Tension between case study participants highlights greater malaise in the form social dilemmas provoked by washback from high stakes assessments. Second, tension is contained through the positioning of amorphous forms that draw the viewer to the middle ground of the painting and story. The short story begins and ends with

darkness: the charred landscape and the swamp. In between the story unfolds in a bucolic recovering landscape. The landscape in which the character Nick prospers and undergoes healing is a recovering post-fire forest environment. The panarchy analogy predicts that such a space is consistent with E.O. Wilson's (1998) consilience project for education is at the early stages of Growth or r-phase in the ACC, that is, the space where experts in consilience are generalists, not unlike r-selected species in post disturbance environments.

- Third, and of particular interest to Hemingway, were Cezanne's watercolours and his use of white. A shape could be delimited by untouched white paper. There is overlap with Cezanne's technique of white and with Hemingway's theory of omission. Hemingway believed in leaving that which is known in severe detail unsaid hoping that it will come across somewhat subtly to the reader through the main text. Melling (2009) interpreted the short story *Big Two-Hearted River* as being about Indians and the experiences of Nick in the First World War, although neither is mentioned by Hemingway. Melling (2009) has argued for the case of Indianness throughout the text. This is conveyed in Nick's observations of Nature and the perception of harmony within it and his discord with it. The relevance of Indianness to this thesis is that it is a reminder of Maoriness. *La ruse de guerre* refers to an attack and massacre in the Seney region of English fort by the Ojibwa Indians in the late seventeenth century. The Indian warriors pretended to play outside the fort to reduce the vigilance of the English soldiers. Similarly the playful nature of constructivist teaching belies the seriousness of the profession and the intense responsibility of the teacher for the futures of the students. Play, as in war, as in Nature, and teaching are for survival.
- The character Nick wishes, like the trout he observes from the bridge, to hold steady in the current. Here there is overlap with the notion of co-evolution of species' populations. Here populations must adapt to constant change just to maintain their position in the ecosystem. This is known as the Red Queen hypothesis – an allusion drawn from *Alice through the Looking Glass*, where Alice realises she must run as hard as she can too remain in the same place. The life of the learner in the secondary school system may be like this. Students constantly adapt socially. They are constantly confronted with a stream of activities made to challenge them. Challenges are resolved only to dissipate the energy of the teacher (see previous section SOHO systems and teaching and learning).

CHAPTER 10

CONCLUSIONS

The purpose of this thesis was to consider steps towards fulfilling the Principle of Coherence in *The New Zealand Curriculum* for learning languages. To do this I have proposed the concept of curriculum grace through consilience and used ecological change metaphors to interpret the students' learning of French when immersed in authentic contexts. I now outline the contributions to knowledge that have emerged from my research objective along with possible directions for future research.

Contributions to Knowledge

Defining Consilience

To apply consilience to the teaching and learning of French in the *NZC* it was necessary first to review the current definitions. From an amalgamation of elements of those definitions I developed one that could be applied to the teaching of languages.

There are potentially three shades of consilience as follows:

- a) The process of abstraction of inductions, based on Whewell (1847).
- b) A biological explanation of culture after E.O. Wilson (1998). E.O. Wilson's conceptualisation of consilience involves the identification of those aspects of human nature that endanger humanity and biodiversity. Wilson sought to provide a biological interpretation for his own religious experience and his desire for communion and transcendence.

c) Congruence between the disciplines as based on the work of (Wilson 2012) which can be considered part of the second wave of consilience discussed by Slingerland and Collard (2012).

I presented a possible fourth definition of consilience as an amalgamation of the three aforementioned aspects, one which drew on the concept of “metapatterns”, which are the “patterns that connect” in Bateson’s *Steps to an Ecology of Mind* (1979 p. 11) and Volk’s *Metapatterns* (1995). Such a variation to the forms of consilience is predicated on the way in which various themes connect across cultural phenomena, and these can be translated into biological patterns. This form of consilience facilitates the horizontal integration of an array of topics taught in a Level 8 French class in New Zealand through an underpinning elemental theme of universal human nature. This theme can be then related to an epigenetic rule that can draw classroom discussion and student thinking into ontology and epistemology.

A Forest Ecosystem as a Metaphor for Teaching and Learning

The panarchy model has been used to view a wide range of natural, socio-ecological, social, political, economic (Gunderson et al., 2001) and psychological systems (Varey, 2011). In this thesis I have provided a working model of the cycle of teaching and learning process as the life cycle of a fire-prone forest ecosystem. Along with the work of Stanger et al. (2013) the metaphor appears to constitute an original lens through which to consider how students learn.

Holling’s model is comprised of four phases: conservation, collapse, re-organisation and growth. The system is “...a tautology of birth, growth and maturation, death, and renewal.” (Gunderson, Holling & Peterson, 2002 loc. 6447). The cycle begins at (i) the Conservation meta-stable state (cf climax forest ecosystem: long life span, small number of offspring, require specific conditions). With the advent of an ‘authentic experience’ the system temporarily collapses, losing connectivity with a release of stored energy/tension and ‘falls’ to (ii) the Release state (cf spark that starts a forest fire). At this point the system is close to ‘equilibrium’. This is followed by (iii) the Re-organisation state where connections are re-evaluated and re-arranged. Lastly, the system reaches the Exploitation state (iv). Here, new entities (ideas) are produced in great number to respond to the rapidly changing conditions which requires adaptation and change (cf weeds invading disturbed environments).

The adaptive change cycle (ACC) is three dimensional. The y-axis denotes 'capacity/potential' for change. The x-axis denotes connectedness of abiotic and biotic elements within the system. The z-axis denotes the cycle's resilience to resist system shocks.

The response of the system to crisis is determined by three dimensions: resilience (feedback and the ability of the system to bounce back after disturbance, how much can the system bear before it becomes another system); connectedness (level of controllability of the system); and potential (accumulation of experiences and the readiness for change).

The concept of ecosystem resilience applied as a metaphor in classrooms may have overlap with such elements as the staying power of an idea and the development of individual self-esteem through the processes of feedback.

Connectedness is analogous to the level of controllability that teachers may have over how students develop their ideas; that is, the level of self-determination of the students and their openness to new and/or distracting ideas.

Potential in the learner may relate to the accumulation of connectedness; that is, integrated knowledge. Potential could be related to the susceptibility for change.

Change in a fire-prone forest ecosystem may occur dramatically, resulting in the collapse of the entire system before renewal is possible. Similarly, the forest ecosystem panarchy metaphor of teaching and learning shows that the generation of new ideas also requires a 'dramatic' collapse of old idea structures. Change in the forest system appears analogous to Piaget's (1950) model of adaptive learning of equilibration through assimilation and accommodation. The human learning ACC may be made up of adaptive cycles of varying sizes and scales, embedded in a matrix of perception and consciousness. The ACC in this instance appears as a fractal image. The individual's learning process is an adaptive learning cycle comprised of nested adaptive learning cycles. Accommodation occurs incrementally in significant learning events, as represented by the multiple ACC figures of eight that denote different stages of cognitive developmental processes. These learning events are embedded in the matrix of assimilation learning events.

Insights

In the following passages I identify insights that are derived from the teaching and learning of consilience through the panarchy metaphor.

I) Consilience themes as means to break down discipline barriers at K-phase, opening up a portal between Learning Areas and providing an organisational template at α -phase to generate links between Learning Areas

E.O. Wilson's (1998) consilience is the notion that many aspects of human culture and behaviour can be explained essentially through direct and indirect biological causes and more often by evolutionary causes. If a consilience theme, such as an evolutionary psychological explanation of French medieval courtly love, is introduced at the Conservation (K) phase of the cycle, that theme could perform the role of a disorientating dilemma. Such a disturbance event could open up a portal between learning areas such as biology and literature or literature and French language learning.

Consilience opens up conceptual avenues into considering cross-disciplinary concepts, and could be a meeting point for developing a variety of ideas. If it was introduced at the Re-organisation (α) phase it could serve as an organisational template to provide order and direction for the student to support their sense-making or understanding of the links between ideas.

ii) Consilience and Coherence for the teacher-researcher

It is widely accepted that the way in which human cultures relate to the Earth is one of the causes of the current planetary environmental crisis (Hardin, 1968; Bateson, 1972; Lovelock, 1979, 1995, 2006; Wilson, 1998, 2014; Groom et al., 2006; Harding, 2009; Orr, 1992; Capra, & Luisi, 2014; Clarke, 2014; Watane & Yapp, 2015).

The ecological postmodern in the context of education is a means to address the human relationship with the planet through the development of holistic thinking or 'ecological literacy' (Clarke, 2014 p. 14). Ecological literacy refers to our ability to understand the basic principles of ecology and sustainability. This includes seeing the interdependence of all phenomena, seeing our nestedness in societal and natural cycles. As a corollary of these realisations there may be a sense of transcendence from self and oneness with the *other*

(Capra & Luisi, 2014). In this thesis I have looked at the responses to the teaching and learning of consilience. Consilience as sociobiological content in the language class may provide opportunities for learner transformation in respect to how the learner relates to the world and in particular the natural world.

The use of panarchy as a lens to interpret the learning process could offer the researcher and the teacher the opportunity to see teaching and learning as an animate process of becoming (Clarke, 2014). Further, the realisation that as a researcher or teacher one is part of a greater whole of complex ecological systems could lead to a sense of oneness and an intellectual and spiritual transformation (Charlton, 2008). This transcendence could lead to an awareness of the connectedness of all things and hence an improved environmental ethic (Leopold, 1966) that is compatible with ecological sustainability (Capra & Luisi, 2014), which is one of the Values advocated by the *NZC* (MoE, 2007 p. 7).

This transcendence could be achieved via four portals. First, the teacher-researcher may achieve a sense of coherence between Nature and the learning process and classroom dynamics. The realisation that classroom dynamics share the ecological pattern of panarchy renders the study of teaching and learning ecological, thus making a scientific link between two apparently disparate disciplines.

The contemplation of the beauty and elegance of Nature may lead to greater prosociality (Scarry, 1999; Diessner, Davis & Toney 2009). In this light, I suggest that the panarchy model is in itself elegant and its study in the context of teaching and learning may provide a deep appreciation for the natural world of which we are an integral part.

E.O. Wilson's (1998) concept of consilience involves a personal attempt to address the religious experience and traditions that have their origins in the innate desire to belong, which is characteristic of humans as a truly and deeply social animal. The understanding that we are involved in, and made up of panarchies, may satisfy the epigenetic predisposition for transcendence. This satisfaction could engender transformation in both the teacher and researcher, and thus contribute to the development of the *NZC* Values of "ecological sustainability" (MoE, 2007 p. 7) through a sense of holism.

To see learning in terms of a forest ecosystem could be thought of as a work of the poetic imagination. The use of poetic devices such as metaphors as a means to think about teaching

and learning offers the players in education an opportunity to engage in a merging of literature and education research.

iii) Panarchy as a theoretical framework to describe the teaching and learning process and other learning theories

The experiential learning cycle and panarchy.

The panarchy model for education thus far developed appears to have overlap with aspects of Kolb and Kolb's (2009) experiential learning cycle. The New Zealand Ministry of Education (2004) restated the four phases of the experiential learning cycle as experience, reflection, generalising and abstracting, and transfer. Each phase can be aligned to the ACC. Experience relates to the shift from conservation to collapse ($K \rightarrow \Omega$). Reflection overlaps with the transition from collapse to re-organisation ($\Omega \rightarrow \alpha$). Generalising and abstracting, where the learner reflects on the answers to the questions posed during the reflection phase, has association with the transition from re-organisation to the renewal and growth phase ($\alpha \rightarrow r$). In this phase the learners speculate and hypothesize on what would happen if they transferred the experience to other areas in their lives. Finally, in the transfer stage the learner applies the concepts to the coming activity or to their lives. There is overlap at the transfer stage with the beginning of the growth phase leading to conservation ($r \rightarrow K$).

Insights for Future Research from the Application of Panarchy to Teaching and Learning.

Language teaching.

The unwillingness of students in the French class at School #1 to converse in the target language to negotiate meaning during tasks based activities constituted a barrier to language acquisition through authentic peer exchanges in the target language. It did not however restrict students meeting their learning outcomes both from the optic of task based integrated learning and Content and Language Integrated Learning (CLIL). In regards CLIL the most important focus is the enhancement of engagement and understanding (Cross & Gearon, 2013). According to Cross and Gearon (2013) students in a CLIL program are therefore not obliged to discuss topics in the target language if they are responding to texts in the target language. Students under the CLIL program have the liberty to use all the language resources available to them to make meaning. In so saying CLIL could be an avenue worth exploring as

a framework for the teaching and learning of consilience in the New Zealand secondary school context.

Insights for Further Refinement of the Panarchy of Teaching and Learning Metaphor

Teaching and Learning as a Self-organising Holarchic System (SOHO)

The ACC model (Holling (2001) and panarchy (Gunderson et al., 2002) include the notion of an attractor. An attractor in an ecological system is defined as the features that determine the nature of the ecosystem and where it is grounded (Holling, 2001). It is possible for ecological systems to shift to alternative attractors during the course of their existence and become different stable states (Hobbs & Norton, 1996). I did not include a clear metaphorical link between the ecological attractor and learning in the version used in the analysis of the results. I formulated this aspect while I was in the process of analysing the data in terms of their place on the ACC template. In order to find metaphorical connections between an ecosystem attractor and learning I drew on Kay's (1999) contribution to panarchy. Kay (1999) applied Prigogine's notion of systems as dissipative structures to the ACC. A dissipative structure is an open system that forms spontaneously once flows of energy, materials and information reach a given threshold. Increase in flow will result in increased structure as a means to absorb the incoming energy and so on. Excessive flows will cause the system to break down in a chaotic manner. An ecosystem is comprised of nested dissipative structures in the form of a holarchy, which Kay referred to as self-organising holarchic system (SOHO). In turn, I adapted Kay's (1999) contribution to refine the ACC metaphor for teaching and learning. The flow is composed of the power, affective resources of the teacher and peers, and information. If the flow is below a certain threshold it will have no impact on students. If the flow is above a critical lower threshold, a dissipative structure will form. This dissipative structure is an idea, a schema, or meme developed by the learner in response to challenging information. The emergent idea could be an answer to a thought provoking question posed by the teacher or peers. The dissipative process of the idea will be to assimilate or accommodate the information and power of teacher and peers.

The aforementioned metaphor for learning as a dissipative structure has overlap with existing transformative learning models (Doll, 1986; Karpiak, 2000; Gilstrap, 2007). However, the

novelty of this approach lies in that it is combined to enrich with the ACC metaphor for learning developed in this thesis. If the panarchy metaphor of learning is to be applied in another setting it would be of interest to include the concept of SOHO. Such an application would allow for the interpretation of changes in learner behaviour in response to teaching in terms of flows, in addition to changes with regard to the three dimensions of the ACC. In this way, the explanatory power of the metaphor would be increased.

Evaluative Constructivism and Panarchy

Conner's (2014) evaluative constructivism involves the promotion of students awareness of their learning capacity together with the curriculum content they wish to learn. In other words the students make themselves aware of what they can and desire to learn. I have drawn metaphorical connections between Conner's model and the panarchy of learning.

The enriched soils of the post-fire disturbance forest at the re-organisation phase of the ACC could be considered as a metaphor for favourable situated conditional cognition (see Conner, 2014). Ecologists may create a post-disturbance forest site recovery map revealing the range of attractors for colonising biological communities. This could be analogous to the teacher scoping out the learning patterns and capacity of their students.

NZC Key Competencies, Panarchy and Consilience

The three dimensions of the ACC: Potential, Connectedness and Resilience have overlap with Key Competencies promoted as objectives for life and lifelong learning in the NZC (2007). I have developed this idea drawing on the economic interpretation of the ecological ACC after Holling (2001). Potential in the economic model relates to managerial skills, knowledge and innovation. These three elements translate readily into the Key Competencies of Managing Self and Thinking. Connectedness is a measure of cohesion between elements in a system. Such cohesion can be seen when there is mutual influence in the form of feedback. Key Competencies of Participating and Contributing and Relating to others fulfil aspects of creativity and concomitant feedback. Resilience is promoted through diversity and diversification. Resilience as a Key Competency has overlap with Managing Self where the individual is able to manage or resist change and maintain a healthy position of adaptability. The ACC appears to suggest an argument for consilient knowledge and consilient competency. Dramatic collapse in socio-ecological systems can be catastrophic. The intensity

of such collapse events can be avoided by maintaining systems in a state of becoming. That is, in a state of constant innovation and thus adaptability to perpetual perplexing change. Collapse or dramatic paradigm shifts provoked through intellectual rigidity can also be avoided in the learner through the promotion of learner resilience. Such resilience enables the learner to become a generalist, able to move easily between the disciplines and create syntheses of diverse knowledge. This capability can be achieved through consilience. I consider that it is of merit to further explore the possibility of including consilience as an additional facet of the *NZC* Key Competencies. The addition of consilience would also emphasise the importance of connecting ideas and paying attention to the development of ideas across learning areas; that is, the Principle of Coherence.

Insights from Ernest Hemingway's Short Story *Big Two-Hearted River*

To think of Hemingway's (1922) *Big Two-Hearted River* in terms of the panarchy of learning served to draw out, in poetic ways, aspects of the learning process. The story was for me a way to invigorate the data analysis process and to further enhance the connections I have made between teaching and learning and ecological systems. I now consider Hemingway's chef d'oeuvre as an inspirational point of connection between education theory and ecology.

The Principle of Coherence

Making natural connections between Learning Areas through consilience.

In my case study of School #1, I used a combination of thematic and task based integrated learning. In regards thematic integration, I used consilience as a means to unify disparate discussion topics in a senior high school French class. The selected theme was authenticity. This notion was interpreted as a cultural artefact and a response to both intellectual modernist alienation and the biological predisposition for belonging.

As noted in Chapter 7 (Discussion) students did not utilise the vertical analysis of evolutionary origins in their podcasts. However, as was consistent with Fraser (2000), students successfully drew on a range of topics in the Unit of Work in a largely coherent manner through the completion of their chosen tasks. Students chose not to treat evolutionary human nature in their podcasts, but preferred the natural horizontal connections that emerged through pursuing genuineness of behaviour.

An Approach to Curriculum Grace

Emerson (1841) said in his essay *Circles* that all essential wisdom was not in the scientific treatise but in the sonnet and the play. Zeki (2000) referred to the cubist painters as the first neuroscientists. E.O.Wilson extolled the writers of prose for their keen insights into human nature and invited students of the arts to “colonise science” (E.O.Wilson & Haas, 2014 p. 77). I close this chapter with three vignettes from literature. Each one expresses the perception of an underlying pattern across Nature and thought that are reminiscent of the underpinning process of panarchy that connects ecosystems to the learning of L4 and L5. The images are reminders of the patterns that connect which is the project of all the forms of consilience. In each vignette the connecting pattern appears to be allied to the beautiful. I begin with Pirsig’s (1974) *Zen and the Art of Motorcycle Maintenance*, followed by the ancient Greek myth of Apollo and Daphne from Ovid’s *Metamorphoses*, and I finish with Hesse’s (1949) *The Glass Bead Game*.

In the opening passages of Pirsig’s novel the protagonist describes a flock of red-winged blackbirds that rise from a marsh as he passes on a motorcycle. He said that the birds “...tied things together, thoughts and things” (p. 9). For Pirsig’s companion the red-winged blackbirds were beautiful and brought to mind “a daughter” (p. 9). The point of consilience between the red-winged blackbirds and “a daughter” may be beauty.

To escape the lovesick Apollo, the nymph Daphne called upon her father the river god Peneus for help. At the very moment Apollo grasped her by the waist, Daphne was transformed into a laurel tree. Ovid tells us that all that remained of Daphne was “...her shining loveliness” (Melville & Kenny, 1998 p. 17). The point of consilience between the laurel and Daphne appears to be “shining loveliness”.

In Hesse’s (1943) novel *The Glass Bead Game* Father Jacobus relates the story of the supreme game master Bengel who in his youth wanted to organise all knowledge around a single idea. He was not interested in the “juxtaposition of the fields of knowledge and research”, instead he sought an “interrelationship” which he referred to as an underlying “organic denominator” (p. 166). In this vignette beauty may not lie in the connector itself but in the act of making connections; that is, in the playing of the game (see Roberts, 1997).

I have in this thesis made a multiplicity of connections between learning and ecology through the ACC. I have omitted to discuss the role that beauty could play in making connections between disparate topics and in particular I have left the elegance of the ACC itself unsaid.

For Gunderson et al. (2002) the ACC is fundamentally a pattern of birth, growth, maturity, death and renewal that characterises all living and possibly all non-living systems. The usefulness of seeing teaching and learning through an ecological lens may lead to raising the teacher's awareness of the holistic and nested nature of learning. This natural pattern is arguably a beautiful pattern. In the same way as the red-winged blackbird is connected to "a daughter" via beauty in Pirsig's story, and how Daphne is connected to the laurel through beauty in Ovid's myth, so too the beauty of the ACC may connect both the teacher and the education researcher to Nature.

In closing, aspects of Bateson's (1972) notion of grace are manifested when the individual perceives essential natural patterns through an engagement with the beauty of Nature and art (Bateson, 1972; Charlton, 2008). It has been my implicit intention that the beauty of the adaptive change cycle, as a fundamental complex pattern of evolving Nature, would lead to a realisation of Bateson's notion of grace for the players in the field of teaching and learning. This is what I refer to as curriculum grace.

BIBLIOGRAPHY

- Adams, D. (2015). *Daina Adams Artist*. Retrieved 12 29, 2015, from <http://dianaadams.co.nz/>
- Adler, M. (1982). *On Behalf of the Members of the Paideia Group (1982). The Paideia Proposal: An Educational Manifesto*. . New York: Simon & Schuster.
- Adler, M. (1984). *The Paideia program : an educational syllabus* . New York : Macmillan .
- AFNZ. (2012). *Phase Pilote du DELF scolaire - Nouvelle-Zelande*. Retrieved November 14, 2014, from New Zealand Association of French Teachers:
<http://www.french.ac.nz/delfscolaire>
- Agnew, A. (2011). *The Twitch that Grew. The Press (Christchurch)*.
- Alberta Ministry of Education. (2010). *Handbook for French immersion administrators*.
Edmonton, Canada: Author.
- Alderton, Z. (2015). *The Spirit of Colin McCahon*. Cambridge Scholars Publishing.
- Allen, A. (2014). Sexual Selection's Mystique Lingers. *BioScience*, 64(5), 375-380.
- Arslan, R.S. and Saka, C.K. (2010). Teaching English to Science Students via Theme-Based Model of Content Based Instruction. *Journal of Turkish Science Education*, 7(4), 26-37.
- Aronson, J., Steele, C. M., Salinas, M. F., & Lustina, M. J. (1998). The effects of stereotype threat on the standardized test performance of college students. In E. Aronson (Ed.), *Readings about the social animal* (8th ed., pp. 415–430). New York, NY: Freeman.
- Arundale, R. B. (2010). Constituting face in conversation: face, facework and interactional achievement. *Journal of Pragmatics.*, 42(8), 2078–2105.
- Assor, A., Roth, G., & Deci, E. L. (2004). The emotional costs of parents' conditional regard:.. *Journal of Personality*, 72(1), 47–88.
- Avicenna. (1945). *A Treatise on Love by IBN SINA (Rislah fi'l ishq)* translated by E. L. Fackenheim. *Medieval Studies*, 7, 208-28.

- Axelrod R. & Hamilton, W.D. (1981). The Evolution of Cooperation. *Science*, 211(4489), 1390-1396.
- Axelrod, R. (1984/2006). *The Evolution of Cooperation* (Kindle ed.). New York: Basic Books.
- Ayers, W. (2006). A Single Spark Can Start a Prairie Fire: Teaching Toward Transformation. *Schools: Studies in Education*, 3(2), 17-27.
- Bachorowski, J.-A. (n.d.). *Laugh sounds*. Retrieved September 8, 2014, from Vocal Acoustics Laboratory Vanderbilt University:
<http://www.psy.vanderbilt.edu/faculty/bachorowski/laugh.htm>
- Bachorowski, J-A & Owren, M.J. (2003). Sounds of emotion: The production and perception of affect-related vocal acoustics. *Annals of the New York Academy of Sciences*, 1000(1), 244-265.
- Bachorowski, J-A.& Owren, M.J. (2001). Not all laughs are alike: Voiced but not unvoiced laughter readily elicits positive affect. *Psychological Science*, 12(3), 252-257.
- Baigent, H., Lincoln, R., & Leigh, M. (2004). *Holy blood, holy grail*. Aware Journalism.
- Bailer Jones, D. (2002). Models, Metaphors and Analogies. In P. & Machamer, *The Blackwell Guide to the Philosophy of Science* (pp. 108-127). Oxford, UK: Blackwell Publishers Ltd.
- Bailer-Jones, D. (2002). Models, Metaphors and Analogies. In P. M. Silberstein, *The Blackwell Guide to the Philosophy of Science* (pp. 108-127). Blackwell Publishing. Retrieved 1 27, 2015
- Bakhtin, M. (1965/1984). *Rebelais and his world*. Bloomington: Indiana University Press.
- Balaev, M. (2014). Language's limits and a doubtful nature. *The Hemingway Review*, 33(2), 107-118.
- Barker, C. (2013). *Dialogue and dialectic in twelfth- and thirteenth-century Occitan and Old French*. London: Kings College London. Retrieved May 6, 2015, from https://kclpure.kcl.ac.uk/portal/files/12489616/Studentthesis-Camilla_Barker_2013.pdf

- Barnard, C., Brown, C., & Gray-Wallis, J. (1983). Time and Energy Budgets and Competition in the Common Shrew (*Sorex araneus* L.). *Behavioural Ecology and Sociobiology*, 13(1), 13-18. Retrieved January 22, 2013, from <http://link.springer.com/article/10.1007%2F00295071?LI=true>
- Barraja-Rohan, A.-M. (2011). Using conversation analysis in the second language classroom to teach interactional competence. *Language Teaching Research*, 15(4), 479–507.
- Batáry, P.; Fronczek, S.; Normann, C.; Scherber, C. & Tschardt, T. (2014). How do edge effect and tree species diversity change bird diversity and avian nest survival in Germany's largest deciduous forest? *Forest Ecology and Management*, 319(1 May), 44-50.
- Bateson, G. (1972). *Steps to an Ecology of Mind*. Northvale, New Jersey: Jason Aronson Inc.
- Bateson, G. (1979). *Mind and Nature*. New York: Bantam Books.
- Bateson, M. (2012). Celebrating a Life in Science. In memory of Lynn Margulis - March 23-25. Amherst: University of Massachusetts. Retrieved from <https://www.umass.edu/lynnmargulis/>
- Bateson, N. (Producer), & Bateson, N. (Director). (2010). *An Ecology of Mind* [Motion Picture].
- Baumeister, R.F and Leary, M.R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation.. *Psychological Bulletin*, 117(3), 497-529.
- Beals, F.; Hipkins, R.; Cameron, M. and Watson, S. (2003). *An evaluation of professional development to support the arts in the New Zealand curriculum*. New Zealand Council for Educational Research (NZCER). Wellington: Ministry of Education. Retrieved from <http://www.nzcer.org.nz/system/files/arts-pd-noapp.pdf>
- Becker, M. (2009, 4 9). *MSU news*. Retrieved from MSU presents Presidential Medal to famed scientist Edward O. Wilson: <http://www.montana.edu/news/7071/msu-presents-presidential-medal-to-famed-scientist-edward-o-wilson>

- Bell, J. N. (1986). Avicenna's Treatise on Love and the Nonphilosophical Muslim Tradition. *Der Islam*, 63(1), 73-89.
- Bell, C. (2008). 100% PURE New Zealand: Branding for back-packers. *Journal of Vacation Marketing*, 14(4), 345-355.
- Beer, S. (n.d.). *What is Cybernetics?* Retrieved December 22, 2012, from Youtube: <https://www.youtube.com/watch?v=JJ6orMfmorg>
- Bencze, L., & Hodson, D. (1999). Changing practice by changing practice: Toward more authentic science and science curriculum development. *Journal of Research in Science Teaching*, 36, 521-539.
- Bender, R.; Tobias, P.V & Bender, N. (2012). The Savannah hypotheses: origin, reception and impact on paleoanthropology. *History and philosophy of the life sciences*, 34(1-2).
- Benge, F., personal communication, 9/6/2015
- Bennett, S. (2013). Mondrian's Search for Geometric Purity: Creativity and Fixation. *American Imago*, 70(3), 515-555.
- Bergson, H. (1940/1999). *Le Rire: Essai sur la signification du comique*. Paris: Quadrige.
- Berman, R. (2007). Hemingway's Michigan Landscapes. *The Hemingway Review*:(2), 39-54.
- Bessant, K. (2010). Authenticity, Community, and Modernity. *Journal for the Theory of Social Behaviour*, 41(1).
- Biggs, R., F. R. Westley, and S. R. Carpenter. (2010). Navigating the back loop: fostering social innovation and transformation in ecosystem management. *Ecology and Society*, 15(2). Retrieved 4 2, 2014, from <http://www.ecologyandsociety.org/vol15/iss2/art9/>
- Bishop, R. (2012). Pretty difficult: Implementing kaupapa Māori theory in English-medium secondary schools. *New Zealand Journal of Educational Studies*, 47(2), 38-50.
- Black, P and Williams, D. (1998, March). Assessment and Classroom Learning. *Assessment in Education*, 7-71.
- Blackmore, S. (2000). *The Meme Machine*. Oxford: Oxford University Press.

- Blattes, S.; Jans, V. & Upjohn, J. (2013). *Minimum competence in scientific English (Nouvelle édition)*. Grenoble, France: EDP Sciences.
- Bloom, H. (1956). Bloom, B.S. (Ed.) *Taxonomy of Educational Objectives, the classification of educational goals. Handbook I:*. New York: McKay: Cognitive Domai. .
- Blyth Jr., C. ; Recktenwald, S. & Wang, J. (1990). I'm like, "Say What?!": A New Quotative in American Oral Narrative. *American Speech*, 65 (3), 215-227.
- Boase, R. (1977). *The origin and meaning of courtly love: a critical study of European scholarship*. Manchester University Press.
- Boix-Mansilla, V. & Dawes Duraisingh, E. (2007). Targeted Assessment of Students' Interdisciplinary Work: An Empirically Grounded Framework Proposed. *The Journal of Higher Education*, 778(2), 215-237.
- Boix-Mansilla, V.; Dawes Duraisingh, E.; Wolfe, C.R. & Haynes, C. (2009). Targeted Assessment Rubric: An Empirically Grounded Rubric for Interdisciplinary Writing. *The Journal of Higher Education*, 80(3), 334-353.
- Boix-Mansilla, V. (2008). *Symposium World Knowledge Dialogue 2008 : Roundtable*. Retrieved from World Knowledge Dialogue: <http://www.wkdialogue.ch/>
- Bové, J., & Dufour, F. (2002). *The world is not for sale: Farmers against junk food*. Verso.
- Braman, B. (2008). *Meaning and Authenticity: Bernard Lonergan and Charles Taylor on the Drama of Authentic Human Existence* (Kindle ed.). Toronto: University of Toronto Press.
- Braunda, M. & Reiss, M. (2006). Towards a More Authentic Science Curriculum: The contribution of out-of-school learning. *International Journal of Science Education*, 28(12), 1373–1388.
- Brewerton, M. (2004). Reframing the Essential Skills: Implications of the OECD Defining and Selecting Key Competencies project. A background paper for the Ministry of Education. Wellington: Ministry of Education (unpublished).
- Brinton, D. 2003. Content-based instruction. In D. Nunan (ed.) *Practical English Language Teaching*. New York: McGraw-Hill.

- Bronowski, J. (1973). *The Ascent of Man*. BBC.
- Brown, D. (1991). *Human Universals*. Philadelphia: Temple University Press.
- Brugger, P. (2001). From Haunted Brain to Haunted Science: A Cognitive Neuroscience View of Paranormal and Pseudoscientific Thought. In J. H. Lange, *Hauntings and Poltergeists: Multidisciplinary Perspectives* (p. Chapter 9). North Carolina: McFarland & Company, Inc.
- Brunton., A. N. (2014). "New Zealanders' Views on the Importance of Learning a Language." *New Zealanders' Perceptions of Asia and Asian peoples –2013 Annual Survey*. Asian New Zealand Foundation.
- Bundy, A.; Heymans, J.; Morissette L.; Savenkoff, C. (2009). Seals, cod and forage fish: A comparative exploration of variations in the theme of stock collapse and ecosystem change in four Northwest Atlantic ecosystems. *Progress in Oceanography*, 81, 188-206.
- Burder, R. L., Tangalakis, K., & Hryciw, D. H. (2014). Use of content based instruction and Socratic discussion for ESL undergraduate biomedical science students to develop critical thinking skills. *Journal of Curriculum and Teaching*, 3(1), pp. 1-9. Retrieved 11 7, 2015, from <http://www.sciedu.ca/journal/index.php/jct/article/view/3603/2313>
- Butler, W. H., & Goldstein, B. E. (2010). The US fire learning network: springing a rigidity trap through multi-scalar collaborative networks. *Ecology and Society*, 15(3), 21.
- Byram, M. (1989). *Cultural studies in foreign language*. Clevedon, UK: Multilingual Matters.
- Caine, R. N., & Caine, G. (1995). Reinventing schools through brain-based learning. *Educational Leadership*, 52, 43-43.
- Callicott, J. (1997). Conservation, Values and Ethics. In G. Meffe, & C. & Carroll, *Principles of Conservation Biology* (p. 729). Sunderland, Massachusetts: Sinauer.
- Campbell, A. & Otrell-Cass, K. (2010). Teaching Evolution in New Zealand's Schools—Reviewing Changes in the New Zealand. *Research in Science Education*, 41(3), 441-451.

- Campbell, J.B.& Reece, N.A. (2005). *Biology. Seventh Edition*. San Francisco: Pearson Education Inc.
- Capra, F. & Luisi, P. L. (2014). *The Systems View of Life: A Unifying Vision* (Kindle ed.). Cambridge University Press.
- Capra, F. (2003). *The Hidden Connections*. London: Flamingo.
- Carey, T. (2013). Consilience. *Philosophy Now*, March/April(95), 25-27.
- Carroll, L. (2012). *Through the Looking-Glass* . Kindle.
- Cassell, J. (2005). Conversation Analysis: Analysing talk-in-interaction. In P. & A. Bloomer, *Introducing Language in Use: a coursebook* (pp. 37-75). London: Routledge.
- Caw, P. (2005). First and second order unification in the social and human sciences. *Graduate Journal of Social Science*, 2(2), 151-169. Retrieved September 6, 2013, from <http://www.gjss.nl/vol02/nr02/a07>
- CDO. (n.d.). *yeah, right!* Retrieved from Cambridge Dictionary Online: <http://dictionary.cambridge.org/dictionary/english/yeah-right>
- Chandrasekhar, S. (1987). *Truth and Beauty, Aesthetics and Motivation in Science*. University of Chicago.
- Chapman, S., McPhee, P., and Proudman, B. (1992). What is Experiential Education? *Journal of Experiential Educatio*, 15(2).
- Charlton, N. (2008). *Understanding Gregory Bateson: Mind, Beauty, and the Sacred Earth* (Kindle ed.). S U N Y Series in Environmental Philosophy and Ethics.
- Christiansen, M.H & Chater, N. (2015). The language faculty that wasn't: a usage-based account of natural. *Frontiers in Psychology*, 6. doi:doi: 10.3389/fpsyg.2015.01182
- Cialdini, R. (1991). Altruism or Egoism? That Is (Still) the Question. *Psychological Inquiry*, 2(2), 124-126.
- Cialdini, R. (2001). The Science of Persuasion. *Scientific American*, 284(2), 76 - 81.
- Cialdini, R. B. (1993). *Influence : science and practice*. New York: HarperCollins College Publishers.

- Clark, K. (1969). *Civilisation: A Personal View*. BBC/Lionheart.
- Clark, K. (1979). *Landscape Into Art*. New York: Harper & Row.
- Clark, K., Gill, M., & Montagnon, P. (1982). *Civilisation a personal view*. BBC videos for education and training.
- Clarke, D. A. (2014). *Ontario Journal of Outdoor Education*, 26(2), 13-17. Retrieved 12 30, 2015, from https://www.researchgate.net/profile/David_Clarke32/publication/280320500_The_Potential_of_Animism_Experiential_Outdoor_Education_in_the_Ecological_Education_Paradigm/links/560024ee08aeba1d9f84baaa.pdf
- Clarkson, B. (2003). *Significance of peatlands in Southland Plains Ecological District*. New Zealand Department of Conservation. Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.214.2888&rep=rep1&type=pdf>
- Classen, A. J. (2013). Dialectics and courtly Love: A and H, Andreas Capellanus and the Carmina Burana. *Journal of Medieval Latin*, 23, 161-183.
- Claxton, G. (2008). *What's the point of school? Rediscovering the heart of education*. Oxford: One World.
- Coffey, H. (2009). *Socratic method*. Retrieved 11 9, 2015, from Learn NC - University of North Carolina School of Education: <http://www.learnnc.org/lp/pages/4994>
- Cohen, E. (1988). Authenticity and Commoditization in Tourism. *Annals of Tourism Research*, 15, 371-386.
- Collins, L. C. (2013). *Exploring empowerment in conversation: delivering video interaction guidance to families of children who are deaf or hard of hearing* (Doctoral dissertation, University of Nottingham).
- Conner, L. (2010). *Learning about Social-ethical issues using Evaluative Constructionism: Case Studies*. Berlin: VDM Verlag Dr. Muller.

- Conner, L. (2014). Students' use of evaluative constructivism: comparative degrees of intentional learning. *International Journal of Qualitative Studies in Education*, 27(4), 472-489.
- Conner, L.N. and Swilka, A. (2014). *European Journal of Education*, 49(2), 165-177.
- Connolly, M. (2013). *The impacts of the Canterbury earthquakes on educational inequalities and achievement in Christchurch secondary schools*. Christchurch: Thesis. Master of Science. Department of Geography, University of Canterbury.
- Copeland, M. (2005). *Socratic Circles: Fostering Critical and Creative Thinking*. . Portland, MN: Stenhouse Publishers.
- Corely, M. (2013). Disfluencies: Comprehension Processes. In H. Pashler, *Enclopedia of Mind*. SAGE.
- Cory, G. (2000). *Toward Consilience: The Bioneurological Basis of Behavior, Thoughts, experience and Language* . New York: Kluwer academic/Plenum Publishers.
- Cosmides, L. M. & Tooby, J. (1997, 1 13). *Evolutionary psychology: A primer*. Retrieved from Center for Evolutionary Psychology: University of California, Santa Barbara : Available at: <http://www.cep.ucsb.edu/primer.html>
- Cosmides, L., Tooby, J., & Barkow, J. (1992). Introduction: Evolutionary psychology and conceptual integration. In: *The adapted mind: Evolutionary psychology and the generation of culture*. (pp. 3-15) Oxford University Press.
- Council, A. (n.d.). *What is Resilience?* Retrieved 4 10, 2014, from Arctic Resilience report: <http://www.arctic-council.org/arr/resources/what-is-resilience/>
- Counts, E. (2012). *Subject Enrolment Statistics and Roll Return information*. Wellington: Ministry of Education. Retrieved 11 12, 2015, from <http://www.educationcounts.govt.nz/statistics/schooling/student-numbers/subject-enrolment>
- Cousin, G. (2009). *Researching learning in higher education*. New York and London: Routledge.

- Coyle, D. (2008). CLIL—A pedagogical approach from the European perspective. . In N. V.-S. Hornberger, *Encyclopedia of language and education* (pp. 97-111). New York: Springer.
- Coyle, D. (2008). CLIL—A pedagogical approach from the European perspective. . In N. V.-S. Hornberger, *Encyclopedia of language and education* (pp. 97-111). New York: Springer.
- Cozolino, L. & Sprokay, S. (2006). Neuroscience and Adult Learning. *New Directions for Adult and Continuing Education*, 110(Summer), 11-19.
- Cress, U. & Kimmerle, J. (2008). A systemic and cognitive view on collaborative knowledge building. *International Journal of Computer-Supported Collaborative Learning*, 3, 105–122.
- Cross, R. & Gearon, M. (2013). *Research and Evaluation of the Content and Language Approach to Teaching and Learning Languages in Victorian Schools*. Melbourne: Melbourne Graduate School of Education. Retrieved from <http://www.education.vic.gov.au/Documents/school/teachers/teachingresources/discipline/languages/CLILtrialresearchrpt.pdf>
- Csikszentmihalyi, M. (1991). *Flow : the psychology of optimal experience* . New York: HarperPerennial.
- Cummins, J. (1994). ‘Knowledge, power, and identity in teaching English as a second language’. In F. Genesee, *Educating Second Language Children*. Cambridge: Cambridge University Press.
- Cunningsworth, A. (2002). *Choosing your coursebook*. Cambridge: Cambridge University Press.
- Dadosky, J. (2010). Sacred Symbols as ExplanatoryGeertz, Eliade and Lonergan. *Fu Jen International Religious Studies*, 4.1(Summer), 137-158. Retrieved 10 1, 2014, from http://www.academia.edu/923769/Sacred_Symbols_as_Explanatory_Geertz_Eliade_and_Lonergan
- Dancygier, N. (2012). Language, Cognition and Literature . In E. & Slingland, *Creating Consilience: Integrating the sciences and the humanities* (pp. 409-423). New York: Oxford University Press.

- D'Angour, A. (2013). Plato and Play: Taking Education Seriously in Ancient Greece. *American Journal of Play*, 5(3), : 293-307.
- Danielle S. McNamara, Arthur C. Graesser, Philip M. McCarthy, & Zhiqiang Cai. (2014). *Automated Evaluation of Text and Discourse with Coh-Metrix*. New York: Cambridge University Press.
- Darwin, C. (1859). *On the Origin of Species* (Kindle ed.). London: John Murray/ A Public domain Book.
- Darwin, C. (1871/2007). *The Descent of Man and Selection in Relation to Sex: The Concise Edition* (Kindle Edition ed.). London: Plume/Penguin Books.
- Darwin, C. (1837). *First Notebook on Transmutation of Species (1837)*. Retrieved from Darwin on Line: <http://darwin-online.org.uk/content/frameset?itemID=CUL-DAR121.-&viewtype=image&pageseq=1>
- Davidson, B.W., & Dunham, RA. (1997). Assessing EFL Student Progress in Critical Thinking With the Ennis-Weir Critical Thinking Essay Test. *JALT Journal*, 19, pp. 43-57. Retrieved 11 7, 2015, from jalt-publications.org/files/pdf-article/jj-19.1-art3.pdf
- Davis, B., Sumara, D. J., & Luce-Kapler, R. (2000). *Engaging minds: learning and teaching in a complex world*. Mahwah, N.J: L. Erlbaum Associates.
- Dawkins, R. (1998). *Unweaving the Rainbow: Science, Delusion and the Appetite for Wonder*. New York: Mariner Books.
- Dawkins, R. (2006). *The Selfish Gene: 30th Anniversary Edition* (Kindle ed.). Oxford: Oxford University Press.
- de Bruin, K., Erickson, L.O. & Hammadou Sullivan, J-A. (2014). A meaningful French Education: experiential learning in French. *The French Review*, 87(3), 65-77. Retrieved 11 11, 2015, from <http://www.aatfri.com/pdf%20files/TheFRNReview65-77.pdf>
- de Lorris, G. & de Meun, J. (1225-1278/2008). *The Romance of the Rose* (Oxford World Classics ed.). (F. Hogan, Trans.) New York: Oxford University Press.

- Dennett, D. (1995). *Darwin's Dangerous Idea*. London: Penguin.
- Dennett, D. (2002, February). *Dangerous Memes*. Retrieved 4 13, 2014, from TED: Ideas worth spreading: https://www.ted.com/talks/dan_dennett_on_dangerous_memes
- De Rougemont, D., & Belgion, M. (1956). *Passion and Society*. Translated by Montgomery Belgion. Revised and Augmented Edition. Faber & Faber.
- Dewey, J. (1938). *Experience and Education* (Touchstone/Kindle ed.). New York: Kappa Delta Pi.
- Desmarais, F. (2015). Caught in an inconvenient nation-branding promise: the problematic '100% pure New Zealand'. *Interdisciplinary Environmental Review*, 16(1), 1-16.
- Dezeczahce, G. & Dunbar, R.I.M. (2012). Sharing the joke: the size of natural laughter groups. *Evolution and Human Behavior*, 33, 775–779.
- Dialogue Analysis*. (n.d.). Retrieved January 3, 2014, from http://omero.humnet.unipi.it/matdid/778/checklist_dialogue_analysis.htm
- Diane Poulin-Dubois, Ivy Brooker, Alexandra Polonia. (2011). Infants prefer to imitate a reliable person. *Infant Behavior and Development*, 34(2), 303–309.
- Diessner, R., Davis, L. and Toney, B. (2009). Empirical Relationships Between Beauty and Justice: Testing Scarry and Elaborating Danto. *Psychology of Aesthetics, Creativity, and the Arts*, 3(4), 249–258.
- Diessner, R., Davis, L., & Toney, B. (2009). Empirical relationships between beauty. *Psychology of Aesthetics, Creativity, and the Arts*, 3, 249.
- Dimock, W. (2014, April 16). 3. Hemingway's In Our Time, Part II (Fall, 2011). Yale Open Courses. Retrieved from <http://www.youtube.com/watch?v=r9CtF8AfwBI>
- Dingwall, R., 1997. Accounts, interviews and observations., Context and method in qualitative research. In: G. Miller and R. Dingwall, eds., *Context and method in qualitative research*. London: Sage, pp. 51-65.
- Dissanayake, E. (1988). *What is Art For?* Seattle: University of Washington Press.

- Dodonov, Y.S. & Dodonova, Y.A. (2011). Basic processes of cognitive development: missing component in Piaget's Theory. *Procedia - Social and Behavioral Sciences*, 30, 1345 – 1349.
- Doll, W. (1986). Prigogine: A New Sense of Order, A New Curriculum. *Theory into Practice*, 25 (1), 10-16.
- Doll, W. (1987). Foundations for a Post-Modern Curriculum. *Paper presented at the Annual Meeting of the Ameri*. Retrieved from <http://search.proquest.com.ezproxy.canterbury.ac.nz/docview/63165431?accountid=14499>
- Domasio, A. (2003). *Looking for Spinoza: Joy, Sorrow, and the Feeling Brain* (Kindle ed.). Houghton Mifflin Harcourt.
- Dondero, M. (2012). Picturing Transcendence. *Image and Narrative*, 13(4), 221-234.
- Doughty, C. & Pica, T. (1986). "Information Gap" Tasks: Do They Facilitate Second Language Acquisition? *TESOL Quarterly*, 20(2), 305-325.
- Drake, S. (1991, October). How our team dissolved the boundaries'. *Educational Leadership*, 20-22.
- Drake, S. M. (1998). *Creating integrated curriculum: Proven ways to increase student learning*. Thousand Oaks, CA: Corwin Press.
- Dronke, P. (1996). *The medieval lyric*. Boydell & Brewer.
- Dunbar, R. (1999). Social perspectives: getting the message. *Interactions*, 6(6), 20-25.
- Dunbar, R. (2004). Gossip in evolutionary perspective. *Review of general psychology*, 8(2), 100-110.
- Dunbar, R. (2012). Bridging the bonding gap: the transition from primates to humans. *Philosophical Transactions of the Royal Society*, 367, 1837–1846.
- Dupuy, B. (2000). Content-Based Instruction: Can it Help Ease the Transition from Beginning to Advanced Foreign Language Classes? *FOREIGN LANGUAGE ANNALS*, 33(2), 205-221.

- Durie, M. (1995). Tino rangatiratanga: Self-determination. *He Pukenga Korero*, 1(1), 44–53.
- Dutton, D. (2000). Mad about flowers. *Philosophy and Literature* ., 24, 249-60.
- Dutton, D. (2010). *The Art Instinct*. New York: Bloomsbury Press.
- Foote, K. J., Joy, M. K., & Death, R. G. (2015). New Zealand dairy farming: milking our environment for all its worth. *Environmental management*, 56(3), 709-720.
- East, M. (2011). Assessing student interactions in the target language: exploring the potential of the interact standard in Year 11. *The New Zealand Language Teacher*, 37, 58-65.
- East, M. (2012). *Task-Based Language Teaching from the Teacher's Perspective*. John Benjamins Publishing Company.
- East, M. (2013). *Teachers' views on the new NCEA interact achievement standard*. Retrieved January 14, 2014, from NZALT:
http://www.nzalt.org.nz/whitepapers/Interact_standard_-_preliminary_research_findings.pdf
- East, M. (2014a). Coming to terms with innovative high-stakes assessment practice: Teachers' viewpoints on. *Language Testing, Online first*, 1-20.
 doi:10.1177/0265532214544393
- East, M. (2014b). Encouraging innovation in a modern foreign language initial teacher education programme: What do beginning teachers make of task-based. *The Language Learning Journal*, 42 (3), 261–274.
- East, M. (2015). Coming to terms with innovative high-stakes assessment practice: Teachers' viewpoints on assessment reform. *Language Testing*, 32(1), pp. 101-120.
- East, M. and Scott, A. (2011a). Working for positive washback: The potential and challenge of the standards–curriculum alignment project. *Assessment Matters*, 3, 93-115.
- East, M. and Scott, A. (2011b). Assessing the Foreign Language Proficiency of High School Students in New Zealand: From the Traditional to the Innovative. *Language Assessment Quarterly*, 8, 179–189.
- Easterlin, N. (2001). Bi guys babies and beauty. *Philosophy and Literature*, 25(1), 155-165.

- Easterlin, N. (2001). Hans Christian Andersen's Fish Out of Water. *Philosophy and Literature*, 25(2), 251-277.
- Edson, M. (2010). Group development: A complex adaptive systems perspective. *Governance for a Resilient Planet. Proceeding of the 54rd Annual Conference of the International Society for the Systems Sciences, Waterloo, Canada*. Waterloo. Retrieved 8 20, 2014, from <http://journals.iss.org/index.php/proceedings54th/article/viewFile/1435/490>
- Edson, M. (2011). A COMPLEX ADAPTIVE SYSTEMS VIEW OF RESILIENCE IN A PROJECT TEAM. *Proceedings of the 55th Annual Meeting of the ISSS*. Hull, UK. Retrieved 8 20, 2014, from <http://journals.iss.org/index.php/proceedings55th/article/view/1635>
- Education, A. M. (2010). *Handbook for French immersion administrators*. Edmonton, Canada. Retrieved from http://erlc.ca/resources/resources/support_french_immersion/documents/handbook_for_french_immersion_administrators.pdf
- Efland, A. (2002). *Arts and Cognition: Integrating the Visual Arts into the Curriulum*. New York: Teachers College Press, Columbia University.
- Egerton, F. (2009). Homage to Frederic E. Clements, Historian of Plant Succession Studies. *Bulletin of the Ecological Society of America*, 90(1), 43-79.
- Ehrenberg, R. (2010). Eureka! Brain makes mental leaps. *Science News*, 177(2), 9.
- Eisner, E. (1998). Does experience in the arts boost academic achidevement? *Art Education*, 7-15.
- Ellis, R. (2005). *Instructed second language acquisition: A literature review*. Wellington, New Zealand: Ministry of Education.
- Engler, G. (1990). Aesthetics in Science and in Art. *Brit J Aesthetics*, 30 (1), 24-34.
- ERO. (2010a). *School #1 Review*. Education Review Office. Retrieved 1 30, 2015, from [http://www.ero.govt.nz/Early-Childhood-School-Reports/School-Reports/\[School#2\]-11-08-2010](http://www.ero.govt.nz/Early-Childhood-School-Reports/School-Reports/[School#2]-11-08-2010)

- ERO. (2010b). *Aranui High School Education Review*. Education Review Office. Retrieved 22, 2015, from <http://www.ero.govt.nz/Early-Childhood-School-Reports/School-Reports/Aranui-High-School-06-04-2010>
- ERO. (2011). *Education Review Office - Directions for Learning: The New Zealand Curriculum Principles, and Teaching as Inquiry*. Wellington: Education Evaluation Reports. Retrieved April 7, 2015, from <http://www.ero.govt.nz/National-Reports/Directions-for-Learning-The-New-Zealand-Curriculum-Principles-and-Teaching-as-Inquiry-May-2011/Findings/The-principles-evident-in-the-interpretation-and-implementation-of-schools-curriculum>
- Estren, M. (2012). The neoteny barrier: seeking respect for the non-cute. *Journal of Animal Ethics*, pp. 2: 6–11. doi: 10.5406/janimalethics.2.1.0006
- Evans, H. (1984). *Insect Biology: a textbook of entomology*. Reading, Massachusetts: Addison Wesley Publishing Company.
- Falk, I. & Guenther, J. (2006, July). Generalising from Qualitative Research: Case studies from VET in Context. *15th NCVET conference*.
- Farella, J. (1984). *The Main Stalk: A synthesis of Navajo Philosophy*. Tucson: University of Arizona.
- Farella, J. (1993). *The Main Stalk: A synthesis of Navajo philosophy*. Tucson, AZ: University of Arizona Press.
- Ferguson, R. (2005). *The Devil and the Disappearing Sea: A True Story About the Aral Sea Catastrophe*. Vancouver: Raincoast Books.
- Finn, A. (2012). Teacher Use of Prosocial and Antisocial Power Bases and Students' Perceived Instructor Understanding and Misunderstanding in the College Classroom. *Communication Education*, 61(1), 67-79.
- Fiske, A. P., & Fiske, S. T. (2007). Social relationships in our species and cultures. *Handbook of cultural psychology*, 283-306.
- Flavell, J. (1996). Piaget's Legacy. *Psychological Sciences*, 7(4), 200-203.
- Flora, J. (1989). *Ernest Hemingway: A Study of the Short Fiction*. New York: Twayne.

- Fogarty, R. (1998). The intelligence-friendly classroom: It just makes sense. *Phi Delta Kappan*, 79(9), 655.
- Foster-Cohen, S.H. (2000). Review article: Relevance: Communication and Cognition (Second edition). *Second Language Research*, 16(1), pp. 77-92.
- Franke, M. A. (2000). *Yellowstone in the Afterglow*. National Park Service. Retrieved from http://www.nps.gov/yell/planyourvisit/publications_afterglow.htm
- Frankel, K. (2012). Coping with the double bind: Bidirectional learning and development in the zone of proximal development. *Learning, Culture and Social Interaction*, 1, 153-166.
- Fraser, D. (2000). Curriculum integration. What it is and is not. set: *Research Information for Teachers*, 3, 34-37.
<http://www.nzcer.org.nz/system/files/press/abstracts/Chapter%202.pdf>
- Fraser, D. (2014). The eternal yearning. *International Journal of Children's Spirituality*, 19(1), 17–24. Retrieved 12 2, 2015, from <http://dx.doi.org/10.1080/1364436X.2014.886559>
- Frazer, J. (1922/1996). *The Golden Bough*. London: Penguin.
- Freire, P. (1970). *Pedagogy of the Oppressed*. New York: Continuum International Publishing Group.
- Freire, P. (1998). *Pedagogy of Freedom: Ethics, Democracy, and Civic Courage. (Critical Perspectives Series: A Book Series Dedicated to Paulo Freire)* (Kindle Edition. ed.). Maryland: Rowman & Littlefield Publishers.
- Freed, B. F. (1995). What makes us think that students who study abroad become fluent. *Second language acquisition in a study abroad context*, 9, 123-148.
- Freeze, R. A. S. (2002). *French Food vs. Fast Food: Jose Bove Takes on McDonald's* (Doctoral dissertation, Ohio University).
- French, J. R. P., Jr., & Raven, B. (1959). The bases of social power. In D. Cartwright, *Studies in social power*. Ann Arbor: University of Michigan Institute of Social Research.

- Galtry, J. (2013). Improving the New Zealand dairy industry's contribution to local and global wellbeing: the case of infant formula exports. *The New Zealand Medical Journal*, 126(136). Retrieved 12 20, 2015, from <https://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2013/vol-126-no-1386/galtry>
- Garcia Landa, J. (2013). *Consilience and Retrospection* . Retrieved 12 12, 2015, from SSRN Social Science Research Network: <http://ssrn.com/abstract=2344625>
- Gardner, H. (2008). *Mutiple Intelligences: New Horizons in theory and Practice*. Basic Books. Kindle Edition.
- Garfinkel, H. (1967). *Studies in ethnomethodology*. Englewood Cliffs, NJ: Prentice-Hall.
- Garner, M. and Borg, E. (2005). An ecological perspective on content-based instruction. *Journal of English for Academic Purposes*, 4, 119–134.
- Garrison, D. R., Cleveland-Innes, M., & Fung, T. S. (2010). Exploring causal relationships among teaching, cognitive and social presence: Student perceptions of the community of inquiry framework. *The Internet and Higher Education*, 13(1-2)(1-2), pp. 31-36.
- Garside, C. (1996). Look who's talking: A comparison of lecture and group discussion teaching strategies. *Communication Education*, 45. doi:<http://dx.doi.org/10.1080/03634529609379050>
- Gawith, E. (2013). The on-going psychological toll from the Canterbury earthquakes. *Disaster Prevention and Management*, 22(5), 395 - 404.
- Geary, D. (2011). The Primal Brain in the Modern Classroom. *Scientific American Mind*, 22(4), 44-49.
- Geary, J. (2011). *I Is an Other: The Secret Life of Metaphor and How It Shapes the Way We See the World*. New York: HaperCollins.
- Genet, R. M. (1997). The development of a concept plan for the ecological restoration of Quail Island (Otamahua). Unpublished master's thesis. environmental science. University of Canterbury, New Zealand

- Genet, R. (2008, December 24). *Comedy of Survival - customer review*. Retrieved August 21, 2014, from Amazon.com: http://www.amazon.com/The-Comedy-Survival-Literary-Ecology/dp/0816516863/ref=sr_1_1?ie=UTF8&qid=1408605652&sr=8-1&keywords=comedy+of+survival
- Genet, R. (2010). Case Study: Soliya Connect Programme at ENSIMAG, France. In F. G. Helm, *Telecollaboration 2.0 for Language and Intercultural Learning*. Bern: Peter Lang Publishing Group.
- Genet, R., & Burrows, C. J. (1999). The ecological restoration of Otamauhua/Quail Island 1: The island's physical setting and history, and planning for ecological restoration. *New Zealand Natural Sciences*, 24, 113-125.
- Gervais, M. & Wilson, D.S. (2005). THE EVOLUTION AND FUNCTIONS OF LAUGHTER AND HUMOR: A SYNTHETIC APPROACH. *The Quarterly Review of Biology*, 80(5), 395-430.
- Giesbrecht, S. (2012). The pedagogy of play. *Education Canada*, 52(1). Retrieved 1 31, 2015, from <http://search.proquest.com.ezproxy.canterbury.ac.nz/docview/1031152629?accountid=14499>
- Gilbert, J. (2005). *Catching the Knowledge Wave*. NZCER Press.
- Gilstrap, G. (2007). Dissipative structures in educational change:Prigogine and the academy. *International Journal of Leadership in Education*, 10(1), 49–69.
- Glynn, T. (2015). Bicultural challenges for educational professionals in Aotearoa. *Waikato Journal of Education*, 20(3), 103-114.
- Goda, Y., Yamada, M., Matsukawa, H., Hata, K., & Yasunami, S. (2014). Conversation with a Chatbot before an Online EFL Group Discussion and the Effects on Critical Thinking. *Journal of Information and Systems in Education*, 13(1), pp. 1-7. Retrieved 11 7, 2015, from https://www.jstage.jst.go.jp/article/ejsise/13/1/13_1/_pdf
- Goldman, R., & Papson, S. (1996). *Sign wars: The cluttered landscape of advertising*. Guilford Press.

- Goodwin, C., & Heritage, J. (1990). Conversation analysis. *Annual review of anthropology*, 283-307.
- Gould, S. (1980). *The Panda's Thumb*. W.W.Norton & Co.
- Gould, S. (1994). *Eight little piggies: Reflections in natural history*. New York: Norton.
- Gould, S. J. (2003). *The hedgehog, the fox, and the magister's pox: Mending the gap between science and the humanities*. Random House LLC.
- Graybill, J.K; Dooling, S.; Shandas, V.; Withey, J. ; Greve, A. & Simon, G.L. (2006). A Rough Guide to Interdisciplinarity: Graduate Student Perspectives. *BioScience*, 56 (9), 757-763.
- Grison, L; Genet, R. & Mitchell, C. (2007). 'De l'utilité de l'enseignement des sciences humaines en cours d'anglais' ('The Applications of Teaching the Humanities during ESL Classes'). *Les Langues au cœur de la transversalité - 35e Congrès UPLEGESS*. Grenoble: UPLEGESS.
- Groom, M.J., Meffe, G.K and Carroll, C.R. (2006). *Principles of Conservation Biology* (Third Edition ed.). Sunderland, MA. USA: Sinauer Associates Inc.
- Gunderson, L. (2002). *Panarchy Synopsis: Understanding Transformations in Human and Natural Systems* (Kindle Edition ed.). Island Press.
- Gunderson, L.; Kinzig, A.; Quinlan, A.; Walker, B.; Cundhill, G.; Beier, C.; Crona, B.; Bodin, Ö. (2010). *Assessing resilience in social-ecological systems: Workbook for practitioners. Version 2.0*. Retrieved from <http://www.resalliance.org/3871.php>
- Gunderson, L.H. & Holling, C.S. (2002). *Panarchy Synopsis: Understanding Transformations in Human and Natural Systems* (Kindle ed.). Washington: Island Press.
- Gunderson, L.H.; Holling, C.S. & Peterson, G.D. (2002). Surprises and sustainability: Cycles of Renewal in the Everglades. In L. & Gunderson, *Panarchy*. Washington: Island Press.

- Gunnthorsdottir, A. (2001). Physical Attractiveness of an Animal Species as a Decision Factor for its Preservation. *Anthrozoös*, 14(4), pp. 204-215.
doi:10.2752/089279301786999355
- Guthrie, E. (1984). Intake, communication, and second language teaching. In S. J. Savignon & M. S. Berns (Eds.), *Initiatives in communicative language teaching* (pp. 35-54). Reading, MA: Addison-Wesley
- Hagemann, M. (1979). Hemingway's Secret: Visual to Verbal Art. *Journal of Modern Literature*, 7(1), 87-112.
- Hall, K., & Nilep, C. (2015). 28 Code-Switching, Identity, and Globalization.
https://www.researchgate.net/profile/Kira_Hall2/publication/275964531_Code-switching_Identity_and_Globalization/links/554c2cdd0cf29752ee7edaff.pdf Access: 22/01/2015
- Hammersley, M. & Gomm, R. (2008). Assessing the Radical Critique of Interviews. In M. Hammersley, *Questioning Qualitative Inquiry: Critical Essays* (pp. 89-100). London: SAGE.
- Hancock, T. (2007). The Chemistry of Love Poetry. *The Cambridge Quarterly*, 197-229.
- Handler, R. (1986). Authenticity. *Anthropology today*, 2(1), 2-4.
- Hardin, G. (1968). The Tragedy of the Commons. *Science*, 162 (3859), 1243-1248.
- Harding, S. (2014). Guest essay Daisyworld. In F. Capra, *A Systems' View of Life* (pp. 165-167). Cambridge University Press.
- Harris, H. (1995). 'Rethinking Polynesian Heterosexual Relationships: A Case Study on Mangaia, Cook Islands'. In W. Jankowiak, *Romantic passion: A universal experience?*. (pp. 95-127). New York: Columbia University Press.
- Harris, L. (1988). Edge Effects and Conservation of Biotic Diversity. *Conservation Biology*, 2(4), 330-332.
- Harvey, S.; Roskvist, A.; Corder, D. & Stacey, K. (2011). *An Evaluation of the Language and Culture Immersion Experiences for Teachers Programmes*. Wellington: Ministry of

Education. Retrieved 11 12, 2015, from <https://www.aut.ac.nz/profiles/sharon-harvey/?a=279263>

Harvey, S, personal Communication, 29/5/2015

Hauser, M.D., Chomsky, N., & Fitch, W.T. (2002). The faculty of language: what is it, who has it ,and how did it evolve? *Science*, 298, 1569–1579.
doi:10.1126/science.298.5598.1569

Hayes, J. (2011). Leadership in a Time of Adversity: A Story from the New Zealand Earthquake. *Management in Education*, 25(4), 135-137.

Hayley, M. (2004, January). Learner-centred instruction and the theory of multiple intelligences with second language learners. *Teachers College Record*, 106(1), 163-180.

He, A. W. (2004). CA for SLA: Arguments from the Chinese Language Classroom. *The Modern Language Journal*, 88, 568–582. doi:10.1111/j.0026-7902.2004.t01-19-.x

Heerey, E.A; Capps, L.M.; Keltner, D. & Kring, A.M. (2005). Understanding Teasing: Lessons From Children with Autism. *Journal of Abnormal Child Psychology*, 33(1), 55-68.

Hemingway, E. (1925). THE Big Two Hearted River. In E. Hemingway, *In Our Time*.

Henton, M. (1996). *Adventure in the Classroom: Using Adventure to Strengthen Learning and Build a Community of Life-long Learners*. Dubuque, Iowa: Kendall/Hunt.

Herwitt, J. (1989). The Kritios Boy: Discovery, Reconstruction and Date. *American Journal of Archaeology*, 93(1), 41-80.

Hesse, H. (1943). *The Glass Bead Game* (2000 ed.). (R. Winston, & C. Winston, Trans.) London: Vintage Books.

Hill, K. (2010, 6 5). *Saturday Morning - Playing Favourites - Maryrose Crook*. Retrieved from Radio New Zealand National:
<http://www.radionz.co.nz/national/programmes/saturday/20100605>

Hipkins, R. (2008). The “something more” in Key Competencies. Set: *Research Information for Teachers*, 3, 35-37.

- Hobbs, M. (2004). *An investigation of the traditional cante jondo as the inspiration of the song cycle 'Five Poems of Garcia Lorca' by Elsisenda Fabriglas*. University of North Texas, Music. Denton: University of North Texas. Retrieved 10 13, 2013, from <http://202.28.199.34/multim/3126574.pdf>
- Hochkirch, A.; Deppermann, J.; Groeninga, J. (2008). Phenotypic plasticity in insects: the effects of substrate color on the coloration of two ground-hopper species. *EVOLUTION & DEVELOPMENT*, 10(3), 350–359.
- Holden, C. & Mace, M. (2009). Phylogenetic analysis of the evolution of lactose digestion in adults. *Human Biology*, 69(5), 597–619.
- Holling, C. (2001). Understanding the Complexity of Economic, Ecological, and Social Systems. *Ecosystems*, 4(5), 390-405.
- Holling, C. S & Gunderson, L.A. (2002). Resilience and Adaptive Cycles. In L. Gunderson, & C. S. Holling, *Panarchy* (pp. 25-62). Washington D.C.: Island Press.
- Holling, C., Gunderson, L. H., & Peterson, G. D. (2002). Sustainabilities and Panarchies. In L. Gunderson, & C. S. Holling, *Panarchy* (pp. 63-102). Washington D.C.: Island Press.
- Holling, C.S.; Carpenter, S.R.; Brock, W.A. & Gunderson, L.A. (2001). Discoveries for Sustainable Futures. In L. & Gunderson, *Panarchy: Understanding Transformations in Human and Natural Systems* (Kindle ed.). Island Press.
- Holling, C.S.; Peterson, G.D. & Allen, C.R. (2008). Panarchies and discontinuities. In A. C. C.S., *Discontinuities in Ecosystems and Other Complex Systems*. New York: Columbia University Press.
- Holling, C.S.; Gunderson, L.H. & Ludwig, D. (2001). In quest of a theory of adaptive change. In *Panarchy: Understanding Transformations in Human and Natural Systems*.
- Hovelynck, J. & Peeters, L. (2003). Laughter, Smiles and Grins: The Role of Humor in Learning and Facilitating. *Journal of Adventure Education and Outdoor Learning*, 3(2), 171-183.

- Huhn, P. (1978). Landeskunde im Lehrbuch: Aspekte Der Analyse, Kritik Undkorrektiven Behandlung. In W. K. Kadden, *Sparche and Kultur Tübingen*. Gunter Narr.
- Illeris, K. (2002). *The three dimensions of learning*. Roskilde Universitet.
- Illeris, K. (Ed.). (2009). *Contemporary theories of learning: learning theorists... in their own words*. Routledge.
- Inbody, T. (1975). Paul Tillich and Process Theology. *Theological Studies*, 36 (3), 472-492. Retrieved 5 14, 2014, from www.ts.mu.edu/readers/content/pdf/36/36.3/36.3.4.pdf
- Ingleton, C. (1999, July). Emotion in learning: a neglected dynamic. In *HERDSA annual international conference*, Melbourne.
- Inkpen, D, Frunza, O & Kondrak, G. (2005). Automatic Identification of Cognates and False Friends. *Advances in Natural Language*.
- Inkpen, D., Frunza, O., & Kondrak, G. (2005, September). Automatic identification of cognates and false friends in French and English. In Proceedings of the International Conference Recent Advances in Natural Language Processing (pp. 251-257). *Proceedings of the International Conference Recent Advances in Natural Language Processing*, (pp. 251-257). Retrieved 11 8, 2015
- Jablonka, E. & Lamb, M.J. (2007). Precis of Evolution in Four Dimensions. *Behavioral and Brain Sciences*, 30(4), pp. 365-89.
- Jackson, P. (2006). *Quail Island a link with the past* (2nd Revised ed.). Christchurch: New Zealand. Department of Conservation , Quail Island Restoration Trust (N.Z.).
- Javis, S. (2013). Capturing the Diversity in Lexical Diversity. *Learning Languages*, 63(March), 87–106.
- Jefferson, G. (2004). Glossary of transcript symbols with an introduction. In G. Lerner, *Conversation analysis: Studies from the first generation* (pp. 13–31). Amsterdam, Netherlands: John Benjamins Publishing.
- Jennings, W. (2011). THE DEBATE OVER KAI TANGATA (MÄORI CANNIBALISM):NEW PERSPECTIVES FROM THE CORRESPONDENCE OF THE MARISTS. *Journal of the Polynesian Society*, 120(2), 129-147.

- Jindal-Snape, D. a. (2010). Observational analysis within case study designs. In D. a. Jindal-Snape, & S. Rodrigues (Ed.), *Using Analytical Frameworks for Classroom Research* (pp. 19-37). Oxon: Routledge.
- Johnson, S. (2010). *Where good ideas come from*. New York: Riverhead Books.
- Johnston, K. (1984). Hemingway and Cézanne: Doing the Country. *American Literature*, 56(1), 28-37.
- Johnston, V. (1947). Breeding birds of the forest edge in Illinois. *Condor*, 49, 45–53.
- Jones, E. (1964). *Ingratiation: a social psychological analysis, (Century Psychology Series)*. Meredith Publishing Company.
- Jowett, B. (2012). *Meno by Plato*. Kindle Edition.
- Jowett, B. (n.d.). *The Symposium*. (B. Jowett, Trans.) Gutenberg Press. Retrieved March 5, 2014, from <http://www.gutenberg.org/ebooks/1600>
- Juan, W. (2013). A Study on Users' Attitudes on the Treatment of the Cultural Content in the College EFL Textbook. *Canadian Social Science*, 9(2, 2013), 87-92.
doi:10.3968/j.css.1923669720130902.6294
- Jung, H. (2002). Edward O. Wilson's Theory of Consilience: A Hermeneutical Critique. *International Journal of Public Administration*, 25(9 & 10), pp. 1171-1197.
- Kang, S. (2005). Dynamic emergence of situational willingness to communicate in a second language. *System*, 33(2), 277-92.
- Kant, I., & Pluhar, W. S. (1987). *Critique of judgment*. Hackett Publishing.
- Kaplan. (2012). Why great ideas come when you aren't trying. *Nature, Nature*
doi:10.1038/nature.2012.10678 . Retrieved from <http://www.nature.com/news/why-great-ideas-come-when-you-aren-t-trying-1.10678>
- Kaplan, H., & Assor, A. (2012). Enhancing autonomy-supportive I-thou dialogue in schools: Conceptualization and socio-emotional effects of an intervention program. *Social Psychology of Education: An International Journal*, 15(2), 251-269.
- Karpiak, I. (2000). Evolutionary theory and the 'new sciences': rekindling our imagination for transformation. *Studies in Continuing Education*, 22(1), 29–44.

- Kauffman, S. A. (2015). *Humanity in a Creative Universe*. Oxford University Press.
- Kay, J. (1999). Ecosystems as Self-organising Holarchic Open systems: Narratives and the Second Law of Thermodynamics. In S. & Jorgensen, *Handbook of Ecosystem Theories and Management* (pp. 135-160). CRC Press-Lewis Publishers.
- Kay, J., & Schneider, E. (1994). Embracing complexity: the challenge of the ecosystem approach. *Alternatives Journal*, 20 (3), 32.
- Kay, S. (2001). *Courtly contradictions: the emergence of the literary object of the 12th century* (Google Books ed.). Stanford: Stanford University Press.
- Keane, T. (n.d). *A Patient Poetic Quest Continues*. Retrieved 2015, from January Magazine: <http://www.januarymagazine.com/fiction/buyingfishing.html>
- Keith. (1969). Fake-Fluent and How to Speak It. *The French Review*, 43(1), 93-95.
- Keltner, D., Young, R. C., Heerey, E. A., Oemig, C., & Monarch, N. D. (1998). Teasing in hierarchical and intimate relations. *Journal of Personality and Social Psychology*, 75, 1231–1247.
- Kenny, A. (2013). *Poetics (Oxford World Classics)* (Kindle ed.). Oxford University Press.
- Key, J. (2011, May 9). New Zealand PM John Key: 'We are 100% pure'. (S. Sackur, Interviewer) BBC News. London. Retrieved 22, 2015, from <http://news.bbc.co.uk/2/hi/programmes/hardtalk/9480610.stm>
- Keyse, S. (2009). *'Uneasy lies the head: Feelings on unease in the experience of visual art'*. *Unpublished Masters Thesis*. Auckland: University of Auckland.
- Kheyrandish, M., Setayeshi, S., Rahmani, A.M. (2012). DISFLUENCY DETECTION ON SPONTANEOUS SPEECH USING. *International Journal on Artificial Intelligence Tools*, 21(5).
- King, B. (2010). "All us girls were like euuh!": Conversational work of be like in New Zealand adolescent talk. *New Zealand English Journal*, 24, 17-36.
- King, M. J. (1955, 1994). *The Papers of Martin Luther King Junior, Vol. 2 Rediscovering Precious Values, September 1951-November 1955*. Berkeley: University of California

Press. Retrieved 5 14, 2014, from <http://mlk-kpp01.stanford.edu/kingweb/publications/papers/vol2/>

- Klein, G. & Jarosz, A. (2011). A Naturalistic Study of Insight. *Journal of Cognitive Engineering and Decision Making*, 5(4), 335–351.
- Knegtering E., Hendrickx L., van der Windt H.J., & Uiterkamp, A. . (n.d.). Effects of species' characteristics on nongovernmental organizations' attitudes toward species conservation policy. *Environment and Behavior*(34), pp. 378–400. doi: 10.1177/0013916502034003006
- Knobloch, N. A. (2003). Is experiential learning authentic? *Journal of Agricultural Education*, 44(4), 22-34.
- Koestler, A. (1967). *The Ghost in the Machine*. London: Hutchinson & Co (Publishers) Ltd.
- Kolb, A.Y. & Kolb, D.A. (2009). The Learning Way: Meta-cognitive aspects of experiential learning. *Simulation and Gaming*, 40, 297-327.
- Kollock, P. (1998). Social Dilemmas: the Anatomy of Cooperation. *Annual Review of Sociology*, 24, 183-214.
- Kordecki, L. (2011). *Ecofeminist Subjectivities: Chaucer's Talking Birds*. New York: Palgrave MacMillan.
- Korobkin, D. (1988). Humour in the classroom: Considerations and stratgies. *College Teaching*, 36(4), 154-158.
- Krashen, S. (1984). Immersion: Why it works and what it has taught us. *Language and Society*, 12(1), 61-64.
- Krashen, S. (1996). The Case for Narrow Listening. *System*, 24(1), 97-100. Retrieved from http://www.sdkrashen.com/content/articles/the_case_for_narrow_listening.pdf
- Krashen, S. (2004a). Applying the Comprehension Hypothesis: Some Suggestions. *International Journal of Language Teaching*, 1, 21-29.
- Krashen, S. (2004b). Why support a delayed-gratification approach to language education? *The Language Teacher*, 28 (7), 3-7. Retrieved from http://www.sdkrashen.com/content/articles/why_support.pdf

- Krashen, S. (2005). Second Language "Standards For Success": Out Of Touch With Language. *International Journal of Foreign Language Teaching*, 1(2), 12-16.
- Krashen, S. (2011). The Compelling (not just interesting) Input Hypothesis. *The English Connection (KOTESOL)*, 15 (3). Retrieved from [http://www.sdkrashen.com/content/articles/the_compelling_\(not_just_interesting\)_input_hypothesis.pdf](http://www.sdkrashen.com/content/articles/the_compelling_(not_just_interesting)_input_hypothesis.pdf)
- Krashen, S. (2013). DOES SIOP RESEARCH SUPPORT SIOP CLAIMS? *International Journal of Foreign Language Teaching*, 8(1), 11-24.
- Kuhn, T. (1962/2012). *The Structure of Scientific Revolutions*. London: The University of Chicago Press.
- Kuhn, T. (1990). The Road since Structure. *PSA: Proceedings of the Biennial Meeting of the Philosophy of Science Association*, 1990, 3-13.
- Kunter, M., Frenzel, A., Nagy, G., Baumert, J., & Pekrun, R. (2011). Teacher enthusiasm: Dimensionality and context specificity. *Contemporary Educational Psychology*, 36, pp. 289–301.
- Ladle, R. (1992). Parasites and sex: catching the Red Queen. *Trends in Ecology and Evolution*, 13, 473-474.
- Lakoff, G. & Johnson, M. (2003). *Metaphors we live by*. Chicago: University of Chicago Pres.
- Laland, K., & Brown, G. . (2002). The golden meme. *New Scientist*, 175(2354), 40-43.
- Lam, M.E and Gonzalez-Plaza, R. (2006). Evolutionary Universal Aesthetics in Ecological Rationality. *Journal of Ecological Anthropology*, 66-71.
- Lamb, R. (1991). "Fishing for Stories: What 'Big Two-Hearted River' Is really About." *Modern Fiction Studies*, 37(2), 161-181.
- Langton, C. (2000). A visual arts curriulum requires vision. *New Zealand Annual Review of Education*, 9, 157-171.
- Larrivee, B. (2012). *Cultivating teacher renewal: Guarding against stress and burnout*. R&L Education.

- Larson, C. L., J. Aronoff, & J. J. Stearns. (2007). The shape of threat: Simple geometric forms evoke rapid and sustained capture of attention. *Emotion* , 526-534.
- Larsen-Freeman, D. (1991). Second Language Acquisition Research: Staking out the Territory. *TESOL Quarterly*, 25(2), 315–350.
<http://doi.org.ezproxy.canterbury.ac.nz/10.2307/3587466>
- Lauer, L. M. (2011). *Play deprivation: Is it happening in your school?* Retrieved 1 31, 2015, from
<http://search.proquest.com.ezproxy.canterbury.ac.nz/docview/964177723?accountid=14499>
- Lawrence, D. (1962). In Our Time: A Review. In R. Weeks, *Hemingway* (pp. 93-94). Prentice-Hall.
- Lazaraton, A. (2003). Evaluative criteria for qualitative research in applied linguistics: Whose criteria and whose research? *The Modern Language Journal*, 87(1), 1-12.
- Le Blanc, R. (1989). *L'enseignement des langues secondes aux adultes: recherche et pratiques*. Ottawa: Les Presses de l'Univerite d' Ottawa.
- Lecaudé, J.-M. (2004). 'Le Fabuleux Destin D'Amélie Poulain de Jean-Pierre Jeunet'. *Canterbury French Monographs*, 72 , 1175-1835.
- Lee, H. Y. (2014). Inquiry-based Teaching in Second and Foreign Language Pedagogy. *Journal of Language Teaching and Research*,, 5(6), pp. 1236-1244. Retrieved 11 7, 2015, from
<http://ojs.academypublisher.com/index.php/jltr/article/view/jltr050612361244/10235>
- Leloup, Jean-Yves. *The Gospel of Mary Magdalene*. Inner Traditions/Bear & Co, 2002.
- Leotta, A. "100% Pure New Zealand:" the Tourist Gaze in Niki Caro's Memory and Desire *Quarterly Review of Film and Video* 29:5, 440-449
- Lennox, B. (2015, 11 17). *Where did NCEA come from?* Retrieved from NZQA:
<http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea/understanding-ncea/history-of-ncea/where-did-ncea-come-from/>

- Lenton, T. (2014). A Philosophical Look at Gaia. Book Review of ' The Gaia Hypothesis: Science on a Pagan Planet' by Michael Ruse. *BioScience*, 64 (5), 455-456.
- Lewis, C. (1950/1994). *The Lion the With and the Wardrobe*. New York: Harper/Trophy.
- Lincoln, Y. S. & Guba, E. G. (1985). *Naturalistic Inquiry*. Beverley Hills, CA: Sage.
- Lišková, S. & Fryntaa, D. (2013). What Determines Bird Beauty in Human Eyes? *Anthrozoös*, 26(1), pp. 27-41. doi:10.2752/175303713X13534238631399
- Little, D. (2007). Language Learner Autonomy: Some Fundamental Considerations Revisited. *Innovation in Language Learning and Teaching*, 1(1), 14-29.
- Long, M.H and Porter, P.A. (1985). Group Work, Interlanguage Talk, and Second Language Acquisition. *TESOL QUARTERLY*, 19(2), 207-228.
- Lonning, R.A., DeFranco, T.C. and Weinland, T.P. (1998). Development of Theme-based, Interdisciplinary ,Integrated Curriculum: A Theoretical Model. *School Science and Mathematics*, 98(6).
- Lorca, F. (1998). Play and the Theory of Duende. In F. Lorca, & C. Maurer (Ed.), *In Search of Duende* (pp. 56-72). New York: New Directions Books.
- Louv, R. (2008). 2008 keynote address. *Journal of the Wilderness Education Association*, 20 (1), 4-6. Retrieved 1 31, 2015, from Retrieved from <http://search.proquest.com.ezproxy.canterbury.ac.nz/docview/61879689?accountid=14499>
- Lovell, J. (2004). 'Shrink to fit' - review of 'Buying a fishing rod for my grandfather' by Gao Xingjiang. Retrieved 9 22, 2015, from The Guardian Books: <http://www.theguardian.com/books/2004/may/15/featuresreviews.guardianreview25>
- Lovelock, J. (1979). *The Gaia Hypothesis*. Oxford: Oxford University Press.
- Lovelock, J. (1995). *The Ages of Gaia*. Oxford: Oxford University Press.
- Lovelock, J. (2006). *The Revenge of Gaia*. Suffolk: Allen Lane, Penguin Books.
- Lynch, D. (2010). It's funny because we think it's true: laughter is augmented by implicit preferences. *Evolution and Human Behavior*, 31, 141–148.

- Lythgoe, K.A. & Read, A.F. (1998). Catching the Red Queen? The advice of the Rose. *Tree*, 13(12).
- MacIntyre, P. D., Z. Dörnyei, R. Clément & K. A. Noels. (1998). 'Conceptualizing willingness to communicate in a L2: a situational model of L2 confidence and affiliation'. *The Modern Language Journal*, 82(4), pp. 545-62.
- MacKay, S. (2003). Teaching English as an international language: the Chilean context. *ELT Journal*, 57(2), 139–48.
- Mahy, M. (2005). *Kaitangata Twitch*. Crows Nest, N.S.W.: Allen and Unwin.
- Maori Dictionary*. (2014, 12 18). Retrieved from Maori Dictionary:
<http://www.maoridictionary.co.nz/search?idiom=&phrase=&proverb=&loan=&keywords=pakeha&search=>
- Marcous, C. (2014). Concerning the Unity of Knowledge and the Aim of Scientific Inquiry. A critique of E.O.Wilson's world view. Unpublished M.A. thesis. 45. Florida State University- Department of Arts and Sciences.
- Marešová J, & Frynta D . (2007). Noah's Ark is full of common species attractive to humans: The case of boid snakes in zoos. *Ecological Economics*, 64, pp. 554–558.
- Markee, N. & Kaspar, G. (2004). Classroom Talks: An Introduction. *The Modern language Journal*, 8.
- Marris. (2009). 'Ecology: Raggamuffin Earth.' *Nature*, 460, 450-453. Retrieved 4 7, 2014, from <http://www.nature.com/news/2009/090722/full/460450a.html>
- Martin, R. (1978). Expert and Referent Power: A Framework for Understanding and Maximising Consultation Effectiveness. *Journal of School Psychology*, 16(1), 49-55.
- Marx, L. (1964). *The machine in the garden: technology and the pastoral ideal in America*. Oxford: Oxford University Press.
- Mason, F. (2002). The Newfoundland Cod Stock Collapse: A Review and Analysis of Social Factors. *Electronic Green Journal, UCLA Library, UCLA*, 1(17). Retrieved from <http://escholarship.org/uc/item/19p7z78s>

- Maynard Smith, J. (1982). *Evolution and the Theory of Games*. Oxford: Cambridge University Press.
- McCann, K. (2000). The diversity–stability debate. *Nature*, 405(11 May 2000), 228-233.
- McCarthy, P.M. & Jarvis, S. (2010). MTLD, vocd-D, and HD-D: A validation study of sophisticated approaches. *Behavior Research Methods*, 42(2), 381-392.
- McClure, M. (2012, 7 13). 'Tourist industry - Tourism overview'. Retrieved from Te Ara - the Encyclopedia of New Zealand: <http://www.TeAra.govt.nz/en/tourist-industry/>
- McCrae, R.R. and Terracciano, A. (2005). Universal Features of Personality Traits From the Observer's Perspective: Data From 50 Cultures. *Journal of Personality and Social Psychology*, 88(3), 547–561.
- McGee, A. et al. (2013). Japanese Education in New Zealand: An evaluative literature review of the decline in students since 2005. *Sasakawa Programmes in New Zealand*(August).
- McGrath, J. E., Arrow, H., & Berdahl, J. L. (2000). The study of groups: Past, present, and future. *Personality and Social Psychology Review*, 4(1), 95-105.
- McLaughlin, B., Rossman, T., & McLeod, B. (1983). Second language learning: an information processing perspective. *Language learning*, 33(2), 135-158.
- McKenzie, S.; Robinson, N.T.M.; Herrera, L.; Churchill, J.C. & Eichenbaum, H. (2013). Learning Causes Reorganization of Neuronal Firing Patterns to Represent Related Experiences within a Hippocampal Schema. *The Journal of Neuroscience*, 33(25), 10243-10256.
- McNamara, A. (2011). Can we measure memes? *Frontiers in Evolutionary Neuroscience*, 3(1), 1-7.
- McNaughton Nicholls, C.; Mills, L.; Kotecha, M. (2013). Observation. In J. Ritchie, J. Lewis, C. McNaughton Nicolls, & R. Ormston, *Qualitative Research Practice: A Guide for Social Science Students and Researchers* (Kindle ed., p. Chapter 9). SAGE.

- McNulty, J.K; Neff, L.A. & Karney, B.R. (2008). Beyond Initial Attraction: Physical Attractiveness in Newlywed Marriage. *Journal of Family Psychology*, 22(1), pp. 135–143.
- Meeker, J. (1972). The comic mode. In C. Glofelty, & H. Fromm, *The Ecocriticism Reader: Landmarks in Literary Ecology* (pp. 155-169). Athens, Georgia: Univeristy of Georgia Press.
- Melling, P. (2009). “There were many indians in the story ”: hidden history in Hemingway’s “Big two-hearted river”. *The Hemingway Review*, 28(2), 45-65.
- Melville, A. (1986). *Metamorphoses / Ovid*. Oxford/New York: Oxford University Press.
- Melville, A.D. & Kenny, E.J. (1998). *Metamorphoses (Oxford World Classics)* (Kindle ed.). Oxford University Press.
- Menzies, D., & Davidson, B. (2002). Authenticity and belonging: The experience of being known in the group. *Group analysis*, 35(1), 43-55.
- Mercer, N. (2010). The analysis of classroom talk: Methods and Methodologies. *British Journal of Educational Psychology*, 80, 1-14.
- Merriam, S. (1998). *Qualitative Research and Case Study Applications in Education*. San Francisco: Jossey-Bass Inc.
- Metrick A., & Weitzman M.L. (1996). Patterns of behavior in endangered species preservation. *Land Economics*, 72, pp. 1–16 . doi:10.2307/3147153
- Meyer, J.H.F.; Land, R. (2006). *Overcoming barriers to student understanding: Threshold concepts and troublesome knowledge*. London: Routeledge.
- Mezirow, J. (1997). Transformative Learning: Theory to Practice. *New Directions for Adult and Continuing Education*, 5-12. Retrieved September 2013, from <http://onlinelibrary.wiley.com.ezproxy.canterbury.ac.nz/doi/10.1002/ace.7401/pdf>
- Miettinen, R. (2000). The concept of experiential learning and John Dewey's theory of reflective thought and action. *International Journal of Lifelong Education*, 19(1).
- Miller, A. (2006). The Crucible. In *Collected Plays, 1944-1961* (pp. 343-457). New York: Library of America.

- Miller, E. (1999, May). *Turn-Taking and Relevance*. Retrieved November 1, 2014, from Eric Miller: <http://www.storytellingandvideoconferencing.com/14.html>
- Miller, S., & Fredericks, M. (2003). The nature of “evidence” in qualitative research methods. *International Journal of Qualitative Methods*, 2(1). Retrieved 13, 2015, from http://www.ualberta.ca/~iiqm/backissues/2_1/html/miller.html
- Millard, J. (2009). Performing beauty: Dove's “Real Beauty” campaign. *Symbolic Interaction*, 32(2), 146-168.
- Milner, B., Squire, L. R., & Kandel, E. R. (1998). Cognitive neuroscience and the study of memory. *Neuron*, 20(3), 445-468.
- Mizutani, S. (2009). *The mechanism of washback on teaching and learning*. PhD Thesis. Auckland University, Educational Psychology. Auckland: Auckland University. Retrieved November 2013
- MoE (2007). *The New Zealand Curriculum*. Wellington: Ministry of Education.
- MoE (2010). *Learning Languages*. Retrieved January 5, 2014, from tki.org: <http://seniorsecondary.tki.org.nz/Learning-Languages>
- MoE (2014, August 31). *Pedagogy for learning languages*. Retrieved January 6, 2015, from TKI: <http://seniorsecondary.tki.org.nz/Learning-languages/Pedagogy>
- MoE (2012, August 18). *What's new or different?* Retrieved January 11, 2014, from TKI: <http://seniorsecondary.tki.org.nz/Learning-languages/What-s-new-or-different#vocab>
- MoE (2012). *What's new or different? New Zealand Curriculum Guides - Senior Secondary*. Retrieved from TKI: Te Kete Ipurangi: <http://seniorsecondary.tki.org.nz/Learning-languages/Achievement-objectives>
- MoE (2015). *School deciles*. Retrieved 11 9, 2015, from Education.govt.nz: <http://www.education.govt.nz/school/running-a-school/resourcing/operational-funding/school-decile-ratings/>
- MoE (2015). *The role of the Ministry of Education*. Retrieved from Education.govt.nz: The role of the Ministry of Education

- MoE (n.d.). *Achievement Objectives*. Retrieved January 8, 2014, from TKI:
<http://seniorsecondary.tki.org.nz/Learning-languages/Achievement-objectives>
- MoE (2004). *Making meaning: Making a difference*. Retrieved July 22, 2014, from
 tki.org.nz: http://www.tki.org.nz/r/health/cia/make_meaning/index_e.php
- Moessinger, P. (2000). *New Ideas in Psychology*, 18, 171-176.
- Mohan, B. (1986). *Language and Content*. Reading MA: Addison-Wesley.
- Monson, D. (2011). Why is la Belle Dame sans Merci? Evolutionary Psychology and the
 Troubadours. *Neophilologus*, 95, 523–541.
- Montuori, A. (2005). Gregory Bateson and the promise of transdisciplinarity. *Cybernetics &
 Human Knowing*, 12(1-2), 147-158.
- Moon, P. (2008). *This horrid practice :the myth and reality of traditional Maori cannibalism*.
 Auckland: Auckland University.
- Moskaliuk, J.; Rath, A.; Devaurs, D.; Weber, N.; Lindstaedt, S.; Kimmerle, J. & Cress, U.
 (2011). Automatic detection of accommodation steps as an indicator of knowledge
 maturing. *Interacting with Computers*, 23(3), 247–255.
- Murphy, E., Dingwall, R., Greatbatch, D., Parker, S. & Watson, P. (1998). Qualitative
 research methods in health technology assessment: a review of the literature. *Health
 Technology Assessment*, 2(16), 1–260 . Retrieved from
[http://www.journalslibrary.nihr.ac.uk/__data/assets/pdf_file/0008/64826/FullReport-
 ha2160.pdf](http://www.journalslibrary.nihr.ac.uk/__data/assets/pdf_file/0008/64826/FullReport-ha2160.pdf)
- Murphy, J. M., & Stoller, F. L. (2001). Sustained-content language teaching: An emerging
 definition. *Tesol Journal*, 10(2/3), 3-6.
- Murray, J. (2006). Cybernetic Circularity in Teaching and Learning. *International Journal of
 Teaching and Learning in Higher Education*, 18(3), 215-221. Retrieved from
<http://www.isetl.org/ijtlhe/pdf/IJTLHE47.pdf>
- Neruda, P. (1922/1978). *Passions and Impressions - translated by Margaret Sayers Peden*.
 Farrar, Straus and Girous, Inc.

- Nolan, J. D., Houlihan, D., Wanzek, M. & Jenson, W. R. (2014) The Good Behavior Game: A classroom-behavior intervention effective across cultures. *School Psychology International* 35(2):191–205. doi: 10.1177/0143034312471473 [aDSW]
- Nunan, D. (2004) *Task-Based Language Teaching*. Cambridge UK: Cambridge University Press. Kindle Edition.
- NPS (2007). "*Fire Management Plan*". 2004 Update of the 1992 Wildland Fire Management Plan. National Park Service. Retrieved 4 29, 2014, from http://www.nps.gov/yell/parkmgmt/upload/2004_fmpupdate.pdf
- Nutta, J.; Bautista, N & Butler, M.B. (2011). *Teaching Science to English Language Learners*. New York: Routledge.
- Nye, A. (1992). A woman's thought or a man's discipline? The Letters of Abelard and Heloise. *Hypatia*, 7(3), 1-22.
- NYU. (2014). Glossary of Cognates - NYU Steinhardt. New York, New York, United States. Retrieved 11 8, 2015, from <http://steinhardt.nyu.edu/scmsAdmin/media/users/xr1/glossaries/ELA/GlossaryCognatesFrenchUpdated5-5-2014.pdf>
- NZAFT (2008). *December 2008: NZAFT Listserv Comments on the Draft Matrix*. Retrieved January 10, 2014, from French Matters: <http://www.french.ac.nz/nzaft-matters>
- NZAFT (2009, June 16). *Matrix Comments, from June 16th 2009* . Retrieved from NZAFT: <http://www.french.ac.nz/nzaft-matters>
- NZAFT (2012). *Level 3*. Retrieved 11 18, 2015, from French: Accessible ideas and resources for French teachers in New Zealand: <http://www.french.ac.nz/ncea-level-3>
- NZAFT (2013, December 12). *French News*. Retrieved January 13, 2014, from French Matters: <http://www.french.ac.nz/newsmodule/view/id/100/src/@random487d4d97c175c/section/190/>
- NZQA (2004). *Assessment Guidelines for NCEA Learning Languages*. Retrieved December 10, 2013, from NZQA: <http://www.nzqa.govt.nz/assets/qualifications-and->

standards/qualifications/ncea/NCEA-subject-resources/German/langguidelinesv220jan06.pdf

NZQA (2012, December 4). *Achievement Standard - Languages 3.3*. Retrieved 10 22, 2014, from NZQA: <http://www.nzqa.govt.nz/nqfdocs/ncea-resource/achievements/2013/as90560.pdf>

NZQA (2012). *French - annotated exemplar level 3 AS91545 (A)*. Retrieved from NZQA: <http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea/subjects/french/annotated-exemplars/level-3-as91545-a/>

NZQA (2012, December). *Languages-Moderator's Newsletter*. Retrieved December 3, 2013, from NZQA: http://www.nzqa.govt.nz/assets/_generated_pdfs/december-2-7084.pdf

NZQA (2012b). *NCEA Resource AS91544*. Retrieved 10 28, 2014, from NZQA: <http://www.nzqa.govt.nz/nqfdocs/ncea-resource/achievements/2013/as91544.pdf>

NZQA (2013). *Effective practice for preventing and detecting academic fraud*. Retrieved January 9, 2014, from NZQA: <http://www.nzqa.govt.nz/providers-partners/assessment-and-moderation/preventing-detecting-academic-fraud/>

NZQA (2014). *90560 Converse in French using complex language*. Retrieved 10 22, 2014, from NZQA: <http://www.nzqa.govt.nz/nqfdocs/ncea-resource/achievements/2013/as90560.doc>.

NZQA (2014, October). *Briefing for the Incoming Ministers, October 2014*. Retrieved 11 17, 2015, from NZQA: <http://www.nzqa.govt.nz/assets/About-us/Our-role/2014-BIM.pdf>

NZQA (2015, 2 11). Retrieved from <http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea/subjects/languages/clarifications/1/interact/>

NZQA (2015, 2 11). Retrieved from <http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea/subjects/languages/clarifications/1/interact/>

NZQA (2015, 11 17). *History of NCEA*. Retrieved from NZQA: <http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea/understanding-ncea/history-of-ncea/>

- NZQA (n.d.). *French - annotated exemplar level 3 AS91545 (A)* . Retrieved January 3 , 2014, from NZQA: <http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea/subjects/french/annotated-exemplars/level-3-as91545-a/>
- NZQA (n.d.). *French - annotated exemplars*. Retrieved January 3, 2014, from NZQA: <http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea/subjects/french/annotated-exemplars/>
- NZQA (n.d.). *French- annotated exemplars Level 1 AS90880 (Resource A)* . Retrieved January 3, 2014, from NZQA: <http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea/subjects/french/annotated-exemplars/level-1-as90880-a/>
- NZQA (n.d.). *Languages Interactions*. Retrieved January 4, 2014, from NZQA: <http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea/subjects/languages/clarifications/interactions/>
- NZQA (n.d.). *French Subject Resources*. Retrieved 11 18, 2015, from NZQA: <http://www.nzqa.govt.nz/assets/qualifications-and-standards/qualifications/ncea/NCEA-subject-resources/French/French-Vocab-L3.pdf>
- NZQA (n.d.). *Our role*. Retrieved 11 17, 2015, from NZQA: <http://www.nzqa.govt.nz/about-us/our-role/>
- O’Conner, K.F., Overmars, F.B. & Ralston, M.M. (1990). *Land evaluation for nature conservation. Conservation Sciences Publication No. 3*. Wellington, New Zealand: Department of Conservation.
- O’Neill, C.; Houtman, D. & Aupers, S. (2014). Advertising real beer: Authenticity claims beyond truth and falsity. *European Journal of Cultural Studies*, 17(5), 585– 601.
- Obeyesekere, G. (2005). *Cannibal Talk: The Man-Eating Myth and Human Sacrifice in the South*. Berkeley: University of California Press.
- O'Brien, S. (2009). “I, also, am in Michigan”: pastoralism of mind in Hemingway’s “Big Two-Hearted River”. *THE HEMINGWAY REVIEW*, 28(2), 66-86.
- Okubo, M., Kobayashi, A., & Ishikawa, K. (2012). A fake smile thwarts cheater detection. *Journal of Nonverbal Behavior*, 36(3), 217-225.

- O'Leary Wanket, M. (2006). Falling out of 'like'. *English Journal*, 95(3), 18-19.
- Olivieira, C. (2013). What Bateson had in Mind About 'Mind'? *Biosemiotics*, 6, 515-536.
- Olsson, J. (2004). *Forensic Linguistics: An Introduction to Language, Crime and the Law*. London: Continuum.
- Orians, G. (2010, 4 29). *Metaphors, Models and Modality*. Retrieved 12 12, 2015, from Politics and Culture: <http://politicsandculture.org/authors/gordon-h-orians/>
- Orians, G.H. & Heerwagen, J.H. (1992). Evolved responses to landscapes. In J. Barkow, & L. & Cosmides, *The adapted mind : evolutionary psychology and the generation of culture* (pp. 555-580). New York: Oxford University Press.
- Ormston, R.; Spencer, L.; Barnard, M. & Snape, D. (2014). The Foundations of Qualitative Research. In J. Ritchie, & J. Lewis, *Qualitative Research Practice: A Guide for Social Science Students and Researchers* (Kindle ed., p. Chapter 1). London: SAGE.
- Orr, D. (1992). *Ecological Literacy: Education and the Transition to a Postmodern World*. SUNY Press.
- Othman, M., Sahamid, H., Zulkefli, M. H., Hashim, R., & Mohamad, F. (2015). The Effects of Debate Competition on Critical Thinking among Malaysian Second Language Learners. (2015). The Effects of Debate Competition on Critical Thinking among . *Middle-East Journal of Scientific Research*, 23(4), pp. 656-664. Retrieved 11 7, 2015, from <http://idosi.org/mejsr/mejsr23%284%2915/15.pdf>
- Ovid. (1998). *Metamorphoses* (Kindle ed.). (A. D. Melville, & E. J. Kenney, Trans.) Oxford: Oxford World Classics.
- Paradis, J. (2010, Fall). *Lecture 17: Evolution and Cybernetics*. Retrieved 12 23, 2012, from MITvideo: <http://video.mit.edu/watch/lecture-17-evolution-and-cybernetics-11856/>
- Patrick, B.C., Hisley, J., & Kempler, T. (2000). "What's everybody so excited about?": The effects of teacher enthusiasm on student intrinsic motivation and vitality. *The Journal of Experimental Education*, 68, pp. 217–236.

- Patterson, L.; Baldwin, S.; Araujo, J.; Shearer, R., & Stewart, M.A. (2010). Look, Think, Act: Using Critical Action Research to Sustain Reform in Complex Teaching/Learning Ecologies. *Journal of Inquiry & Action in Education*, 3(3), 139-157.
- Pelling, M., & D. Manuel-Navarrete. (2011). From Resilience to Transformation: the Adaptive Cycle in Two Mexican Urban Centers. *Ecology & Society*, 16(2). Retrieved September 18, 2014, from <http://www.ecologyandsociety.org/vol16/iss2/art11/>
- Perry, W. (1970). *Forms of Intellectual and Ethical Development In the College Years: A Scheme*. USA: Holt, Rinehart and Winston, Inc.
- Peters, M. (1996). Cybernetics, cyberspace and the university. Herman Hesse's The Glass Bead Game and the dream of a universal language. In M. Peters (Ed.), *Poststructuralism, politics and education*. (pp. 159-176). Westport, CT:: Bergin & Garvey.
- Peterson, G.; Allen, C.R. & Holling, C.S. (1998). Ecological Resilience, Biodiversity, and Scale. *Ecosystems*, 1, 6–18.
- Petridis, S.; Martinez, B.; Pantic, M. (2012). The MAHNOB Laughter Data Base. *Image and Vision Computing*.
- Pettersson, K. (2011). THRESHOLD CONCEPTS: A FRAMEWORK FOR RESEARCH IN UNIVERSITY MATHEMATICS EDUCATION. *ERME7, Seventh Congress of the European Society for Research in Mathematics Education*,,. Rzeszów, Poland. Retrieved from <http://urn.kb.se/resolve?urn=urn:nbn:se:su:diva-66504>
- Piaget, J. (1950). *The Psychology of Intelligence* (Routledge Classics) Taylor and Francis. Kindle Edition.
- Pigliucci, M. & Kaplan, J. . (2006). *Making Sense of Evolution. The Conceptual Foundations of Evolutionary Biology*. Chicago: University of Chicago Press.
- Pigliucci, M. (2012). Who knows what. *Aeon*. Retrieved 11 30, 2014, from <http://aeon.co/magazine/philosophy/massimo-pigliucci-on-consilience/>
- Pinker, S. (2002). *The blank slate : the modern denial of human nature / Steven Pinker*. London: Allen Lane.

- Pinker, S. (2012). Humanities and Human Nature. In E. & Slingerland, *Creating Consilience: Integrating the Sciences and the Humanities (New Directions in Cognitive Science)* (pp. 45-55). New York: Oxford University Press.
- Pollan, M. (2001). *The Botany of Desire*. New York: Random House.
- Porter, A.L. & Rafols, I. (2009). Is science becoming more interdisciplinary? Measuring and mapping six research fields over time. *Scientometrics*, 81(3), 719-745.
- Porto, L. (2012). The Spiraling Propensities of Mind: Towards an Ecological Theory of Human Meaning Systems within a Panarchy of Adaptive Cycles of Human Consciousness. *Proceedings of the 56th Annual Meeting of the ISSS*. Retrieved 4 18, 2014, from <http://journals.iss.org/index.php/proceedings56th/article/view/1949>
- Porush, D. (1991a). Fiction as Dissipative Structures: Prigogine's Theoru and POstmodernism's Roadshow. In N. Hayles, *Chaos and Order: Complex Dynamics in Literature and Science* (pp. 54-84). Chicago: Unisity of Chicago Press.
- Porush, D. (1991b). Prigogine, Chaos, and Contemporary Science Fiction (Prigogine, le chaos, et la science fiction contemporaine). *Science Fiction Studies*, 18(3), 367-386.
- Pound, F. (2009). *The Invention of New Zealand: Art & National Identity, 1930-1970*. Auckland University Press.
- Prabhu, N. S. (1987). *Second language pedagogy (Vol. 20)*. Oxford: Oxford University Press.
- Prigogine, I. (1987). Exploring complexity. *European Journal of Operational Research*, 30(2), 97-103.
- Prigogine, I., & Stengers, I. (1997). *The end of certainty*. Simon and Schuster.
- Proudman, B. (1992). Experiential Education as Emotionally-Engaged Learning. *Journal of Experiential Education*, 15(2), 19-23.
- Provine, R. (1996). Laughter. *American Scientist*, 84(1), 38-45.
- Provine, R. (2000). *Laughter: A Scientific Investigation*. . New York: Viking.
- Psathas, G. (1995). *Conservation analysis*: . Thousand Oaks: Sage Publiations, Inc.

- Quenqua, D. (2012, February 27). They're, Like, Way Ahead of the Linguistic Currrrve. *New York Times*.
- Randle, J. M., Stroink, M. L., & Nelson, C. H. (2015). Addiction and the adaptive cycle: A new focus. *Addiction Research & Theory*, 23(1), 81-88.
- Reddy, Michael J. "The conduit metaphor: A case of frame conflict in our language about language." *Metaphor and thought* (1979): 284-324, from http://www.biolingagem.com/ling_cog_cult/reddy_1979_conduit_metaphor.pdf.
- Rehorick, D. A., & Bentz, V. M. (2008). *Transformative phenomenology: Changing ourselves, lifeworlds, and professional practice*. Lanham, MD: Lexington Books.
- Reiss, M. (2014). Changing one's mind over evolution. In S. Berry, *Christians and Evolution: Christian Scholars Change Their Mind* (pp. 318-330). Oxford: Monarch. Retrieved 12 3, 2015, from http://www.academia.edu/9321713/Changing_one_s_mind_over_evolution
- Remanning, R. (n.d.). Paul Tillich. St. John's Nottingham . Retrieved 5 14, 2014, from www.youtube.com/watch?v=M_HcFLa0b1Q
- Ritchie, J & Lewis, J. (2003). Generalizing from Qualitative Research. In J. Ritchie, & J. Lewis, *Qualitative Research Practice: A Guide for Social Science Students and Reseachers* (pp. 264-278). London: Sage Publications.
- Robb, M.P., MacLagan, M.A. & Chen, Y. (2004). Speaking rates of American and New Zealand. *Clinical Linguistics and Phonetics*, 18(1), 1-15.
- Roberts, P. (2008). From West to East and Back Again: Faith, Doubt and Education in Hermann Hesse's Later Work. *Journal of Philosophy of Education*, 42(2), 249-268.
- Roberts, P. (2008). Life, death and transformation: education and incompleteness in Hermann Hesse's 'The Glass Bead Game'. *Canadian Journal of Education*, 31(3), 667-696.
- Roberts, P. (2012). A Golden Age? Dostoyevsky, Daoism and Education. *Philosophy of Education Society of Australasia Conference*, . National Chiayi University.
- Robins, R. W., Trzesniewski, K. H., & Donnellan, B. M. (2012). A brief primer on self-esteem. *Prevention Researcher*, 19(2), 3-7. Retrieved 2 16, 2015, from

<http://search.proquest.com.ezproxy.canterbury.ac.nz/docview/1140129442?accountid=14499>

- Robson, C. (1993). *Real world research: A resource for social sciences and practioner researcher*. Oxford: Blackwell.
- Robson, C. (2011). *Real World Research* (Third ed.). Chichester: Wiley.
- Rogers, J., Webb, S. & Nakata, T. (2015). Do the cognacy characteristics of loanwords make them more easily learned than noncognates? *Language Teaching Research*, 19(1), 9–27.
- Roloff, M.E. & Champion, D.E. (1985). Conversational Profit-seeking: Inteaction as Social Exchange. In R. Street, & J. Cappella, *Sequence and Pattern in Communicative Behaviour*.
- Romova, Z. (2011). REFLECTIONS ON THE PLACE OF CONTENT-BASED INSTRUCTION IN A TERTIARY EAL PROGRAMME. *New Zealand Studies in Applied Linguistics*, 17(2), 71 - 84.
- Rosenblatt, L. (1956/2005). The Acid Test for Literature Teaching. *English Journal*, 45(2).
- Rosenblatt, L. (1993). The Transactional Theory: Against Dualisms. *College English*, 55(4), 377-386.
- Rosenthal, R. & Jacobson, L. (1968). *Pygmalion in the classroom : teacher expectation and pupils' intellectual development*. New York : Holt, Rinehart and Winston.
- Rosenthale, M. (1977, February Tuesday, 08). Sociobiology: Laying the Foundation For a Racist Synthesis. *The Harvard Crimson*.
- Ross, L. (1961). *Portrait of Hemingway*. Simon and Schuster.
- Roughgarden, J.; Oishi, M.; Akçay, E. (2006, February 17). Reproductive Social Behavior: Cooperative Games to Replace Sexual Selection. *Science*, 311(5763), 965-969.
- RSNZ (2013). *Languages in Aotearoa New Zealand*. Royal Society of New Zealand. Retrieved 11 12, 2015, from <http://www.royalsociety.org.nz/media/Languages-in-Aotearoa-New-Zealand.pdf>

- Rudd, M. (2011). Scientists' Opinions on the Global Status and Management of Biological Diversity. *Conservation Biology*, 25, pp. 1165-1175. Retrieved 7 14 , 2015, from <http://onlinelibrary.wiley.com/doi/10.1111/j.1523-1739.2011.01772.x/epdf>
- Ruusuvuori, J. (2005). "Empathy" and "sympathy" in action: Attending to patients' troubles in Finnish homeopathic and general practice consultations. *Social Psychology Quarterly*, 68(3), 204-222.
- Sadeghi, K. & Dilmaghani, S.K. (2013). The Relationship between Lexical Diversity and Genre in Iranian EFL Learners' Writings. *Journal of Language Teaching and Research*, 4(2), 328-334.
- Sanner, S. & Wilson, A. (2008). The experiences of students with English as a second language in a baccalaureate nursing program. *Nurse Education Today*, 28, pp. 807-813. Retrieved 11 7, 2015, from <http://www.sciencedirect.com/science/article/pii/S0260691708000282>
- Sartre, J.-P. (1943/1957). *Being and Nothingness*. New York: New York : Philosophical Library.
- Savignon, S. J. (1991). Communicative Language Teaching: State of the Art. *TESOL Quarterly*, 25(2), 261–277. <http://doi.org.ezproxy.canterbury.ac.nz/10.2307/3587463>
- Scarino, A. (2005). *Learning Language in the New Zealand Curriculum*. Ministry of Education. Wellington: Ministry of Education.
- Scarry, E. (1999). *On Beauty and Being Just*. The Tanner Lectures on Human Values. Retrieved March 5, 2014, from http://tannerlectures.utah.edu/_documents/a-to-z/s/scarry00.pdf
- Scarry, E. (2010). Beauty and Social Justice -first of two key note addresses. *'Pain in Performance and 'Moving Beauty' (21-22 May, 2010)*. Cambridge. Retrieved 5 6, 2014, from <https://www.youtube.com/watch?v=GhIOwhIxSEw>
- Schama, S. (1996). *Landscape and Memory*. New York: Alfred A. Knopf.
- Scheffer, M., J. Bascompte, T. K. Bjordam, S. R. Carpenter, L. B. Clarke, C. Folke, P. Marquet, N. Mazzeo, M. Meerhoff, O. Sala, and F. R. Westley. (2015). Dual thinking

- for scientists. *Ecology and Society*, 20(2). Retrieved 07 30, 2015, from <http://dx.doi.org/10.5751/ES-07434-200203>
- Scherer-Lorenzen, M. (2008). Functional diversity affects decomposition processes in experimental grasslands. *Functional Ecology*, 22, 547–555 .
- Schleuter, D. ; Daufresne, M. ; Massol, F. & Argillier, C. (2010). A user's guide to functional diversity indices . *Ecological Monographs*, 80(3), 469-484.
- Schmidt, S. (1990). Ecological Renewal Images in 'Big Two-Hearted River': Jack Pines and Fisher King. *The Hemingway Review*, 9(2), 142-146.
- Schrödinger, E. (1967). *What is Life? with Mind Matter and Autobiographical Sketches*. Cambridge: Cambridge University Press.
- Scott, A. & East, M. (2011). The standards review for learning languages. How come and where to? *The New Zealand Language Teacher*, 35 (November), pp. 28-32.
- Scott, C., Symansky, A. (Producers), & Scott, C. (Director). (1983). *Flamenco at 5:15* [Motion Picture]. National Film Board of Canada. Retrieved 12 31, 2011, from http://www.nfb.ca/film/flamenco_at_515/
- Scruton, R. (2009). *Beauty* (Kindle ed.). Oxford University Press.
- Sedikides, C., Wildschut, T., Arndt, J. & Routledge, C. (2008). Nostalgia : Past, Present, and Future. *Current Directions in Psychological Science*, 17, 304-.
- Seegerstrale, U. (2000). *Defenders of Truth: the battle for science in the sociobiology debate and beyond*. New York/Oxford: Oxford University Press.
- Seguin, H., & Treville, M.-C. (1992). Les congeners interlinguaux: Un atout pour acclerer. In J. J. R. Courchene, *Comprehension based second language teaching* (pp. 477–487). Ottawa: University of Ottawa Press.
- Serdar Yildirim and Shrikanth Narayanan. (2009). Automatic Detection of Disfluency Boundaries in Spontaneous Speech of Children Using Audio–Visual Information. *IEEE TRANSACTIONS ON AUDIO, SPEECH, AND LANGUAGE PROCESSING*, 17(1).

- Settlage, J. & Southerland, S. (2012). *Teaching Science to Every Child: Using Culture as a Starting Point*. New York: Routledge.
- Sfard, A. (1998). On two metaphors for learning and the dangers of choosing just one. *Educational Researcher*, 27(2), 4-13. Retrieved 12 14, 2015, from http://www.colorado.edu/physics/phys4810/phys4810_fa08/4810_readings/Sfard.pdf
- Shakespeare, A. (2011). "Agassiz method" of scientific observation. *The Hemingway Review*, 30(2), 36-53.
- Sherman, R. R., & Webb, R. B. (1988). *Qualitative research in education: Focus and methods (Vol. 3)*. Psychology Press.
- Shermer, M. (2008, November 17). Patternicity: Finding Meaningful Patterns in Meaningless Noise. *Scientific American*. Retrieved 1 16, 2015, from <http://www.scientificamerican.com/article/patternicity-finding-meaningful-patterns/>
- Schneider, E.D. & Kay, J.J. (1994). Life as a manifestation of the second law of thermodynamics. *Math. Comput. Model.*, 19(6–8), 25–48.
- Shraeder-Frechette, K.S. & McCoy, E.D. (1993). *Method in Ecology: Strategies for Conservation*. Cambridge University Press.
- Sidnell, J. (2010). *Conversation Analysis: an introduction*. John Wiley & Sons.
- Siegel, A. (2014). What should we talk about? The authenticity of textbook topics. *ELT Journal*, 68 (4). doi:10.1093/elt/ccu012
- Siguyama, M. (2014). Teaching Consilience: A Course Design Template. *Interdisciplinary Literary Studies*, 16(1), 30-56.
- Silverman, D. (2005). *Doing qualitative research: a practical handbook*. SAGE Publications Limited.
- Silverman, D. (2013). *Doing qualitative research: A practical handbook*. SAGE Publications Limited.
- Simensen, A. (2010). Fluency: an aim in teaching and a criterion in assessment. *Acta Didactica Norge*, 4(1).

- Simonsen, S.H.; Biggs, R.; Schlüter, M.; Schoon, M.; Bohensky, E.; Cundill, G.; Dakos, V. Daw, T. (2014). *Applying resilience thinking: Seven principles for building resilience in social-ecological systems*. Stockholm: Stockholm Resilience Centre- Stockholm University.
- Singer, P. (1999). *A Darwinian Left: Politics, Evolution and Cooperation*. London/New Haven: Yale University Press.
- Sitarz, D. (1993). *Agenda 21: The Earth summit strategy to save our planet*. United States: Boulder, CO (United States); EarthPress.
- Skinner, B. (1948). Superstition in the Pigeon. *Journal of Experimental Psychology*, 168-172.
- Slingerland, E. (2014). Toward a Second Wave of Consilience in the Cognitive Scientific Study of Religion. *Journal of Cognitive Historiography*, 1(1), 121-130.
doi:doi:10.1558/jch.v1i1.121
- Slingerland, E.G. & Collard, M. (2012). *Creating Consilience: Integrating the Sciences and the Humanities*. USA: Oxford University Press .
- Smala, S. (2013) Content and Language Integrated Learning (CLIL) pedagogies in Queensland. *International Journal of Pedagogies and Learning*, 8 3: 194-205.
doi:10.5172/ijpl.2013.8.3.194
- Smith, A. (1776/2012). *An Inquiry into the Nature and Causes of the Wealth of Nations* (Kindle Edition. ed.). University Of Chicago Press.
- Smith, J. (2013). Writing ritual, resisting resolution: The short story cycles of Hemingway and Steinbeck. *Short Fiction in Theory & Practice*, 3(2), 175-191.
- Snow, C. (1959). *The Two Cultures*. Canto.
- Snyder, L. (2005). Confirmation for a modest realism. *Philosophy of Science*, 72(5), 839-849.
- Snyder, L. (2011). *The philosophical breakfast club : four remarkable friends who transformed science and changed the world*. New York: Broadway Books.
- Somerville, M. (2008). *The ethical imagination: Journeys of the human spirit*. McGill-Queen's Press-MQUP.

- Soulé, M. (1995). The Social Siege of Nature. In M. a. G. Lease, *Reinventing Nature? Responses to Post-modern Deconstruction* (pp. 137-173). Washington: Island Press.
- Soulé, M. and Lease, G. . (1995). *Reinventing Nature*. Washington: Island Press.
- Sowell, T. (1987/2007). *A Conflict of Visions*. New York: Basic Books.
- Sperber, D. & Wilson, D. (1995). *Relevance : Communication and Cognition*. (Second ed.). Cambridge: Harvard University Press.
- Staib, S. (2003). Teaching and measuring critical thinking. *The Journal of Nursing Education*, 42, 498–508.
- Stanger, N. R. (2011). Moving "eco" back into socio-ecological models: A proposal to reorient ecological literacy into human developmental models and school systems. *Human Ecology Review*, 18(2), 167-173
- Stanger, N.; Tanaka, M.; Tse, V.V.; Starr, L.L. (2013). Winter Counts as Transformative Inquiry: The Role of Creative Imagery as an Expression of Adaptive Change. *Complicity: An International Journal of Complexity and Education*, 10 (1/2), 87-110.
- Stegelin, D. (2005). Making the Case for Play Policy: Research-Based Reasons to Support Play-Based Environments. *YC Young Children*, 60(2), 76-85.
- Stengel, B. (2014). After the Laughter. *Educational Philosophy and Theory*, 46(2), 200–211.
- Sternberg, R. (2002). The Psychology of Intelligence - Book Review. *Intelligence*, 30 , 481–483.
- Stokes, D. (2006). Things we like: human preferences among similar organisms and implications for conservation. . *Human Ecology*, pp. 361-369.
- Stokols, D., R. Perez Lejano, & J. Hipp. (2013). Enhancing the resilience of human–environment systems:a social–ecological perspective. *Ecology and Society*, 18(1). Retrieved July 24, 2014, from <http://dx.doi.org/10.5751/ES-05301-180107>
- Stroller, F. (2004). CONTENT-BASED INSTRUCTION: PERSPECTIVES ON CURRICULUM PLANNING. *Annual Review of Applied Linguistics* ,, 24, 261 -283.

- Sumara, D. Davis, B. and Laidlaw, L. (2001). Canadian Identity and Curriculum Theory: An Ecological, Postmodern Perspective. *CANADIAN JOURNAL OF EDUCATION*, 26(2), 144-163.
- Svoboda, F. (1996). "Landscapes Real and Imagined: 'Big Two-Hearted River.'" *The Hemingway Review*, 16(1), 33-42.
- Tauber, R. (1993). *Wielding Power in the Classroom*.
- Taylor, M. & Moeeda, A. (2013). The 2010 Canterbury earthquake: curriculum shockwaves. *International Research in Geographical and Environmental Education*, 22(1), 57-70.
- ten Have, P. T. (1990). Methodological issues in conversation analysis. *BMS: Bulletin of Sociological Methodology/Bulletin de Méthodologie Sociologique*, 23-51.
- ten Have, P. (2007). *Doing Conversation Analysis*. (2nd ed.). London: SAGE Publications. doi:<http://dx.doi.org.ezproxy.canterbury.ac.nz/10.4135/9781849208895>
- Tepperman, J.; Traum, D. & Narayanan, S. (2006). "Yeah RightT": Sarcasm recognition for spoken dialogue systems. *Interspeech 2006 -ICSLP*, (pp. 1838-1841). Pittsburgh, Pennsylvania.
- Thomson, W. (2007). Natural Drift and the Evolution of Culture. *Journal of Consciousness Studies*, 96-116.
- Tidball, K.G. and Krasny, M.E. (2011). Toward an ecology of environmental education and learning. *Ecosphere*, 2(2). Retrieved 4 18, 2014, from <http://dx.doi.org/10.1890/ES10-00153.1>
- Tilman, D. (2000). Functional Diversity. In S. Levin, *Encyclopedia of Biodiversity* (pp. 109-120). Elsevier Inc. doi: 10.1016/B0-12-226865-2/00132-2
- TKI. (2007, 10 12). *History of curriculum development*. Retrieved from TKI: <http://nzcurriculum.tki.org.nz/Archives/Curriculum-project-archives/Developing-the-draft/History-of-curriculum-development>
- TKI. (2013, 9 18). *Connections through science*. Retrieved from New Zealand Curriculum Guides - Senior Secondary: http://seniorsecondary.tki.org.nz/Science/Connections#beyond_school

- TKI. (2015, 2 10). Retrieved from <http://ncea.tki.org.nz/Resources-for-Internally-Assessed-Achievement-Standards/Learning-languages/French/Level-1-French>
- TKI. (2015, 9 20). *Connections*. Retrieved from New Zealand Curriulum Guides: <http://seniorsecondary.tki.org.nz/Learning-languages/Connections>
- TKI. (2015, 9 18). *Connections*. Retrieved from New Zealand Curriulum Guides: <http://seniorsecondary.tki.org.nz/Social-sciences/Geography/Connections>
- TKI. (2015, 9 18). *Geography*. Retrieved from New Zealand Curriulum Guides: <http://seniorsecondary.tki.org.nz/Social-sciences/Geography>
- TKI. (2015, 9 18). *Key concepts in the arts*. Retrieved from New Zealand Curriulum Guides: <http://seniorsecondary.tki.org.nz/The-arts/Key-concepts>
- TKI. (2015, 11 2). *Resources for internally assessed achievement standards*. Retrieved from <http://ncea.tki.org.nz/Resources-for-Internally-Assessed-Achievement-Standards>
- Tooby, J. & Cosmides, L. (1992). The Psychological Foundations of Culture. In *The Adapted Mind: Evolutionary psychology and the generation of culture* (pp. 19-136). New York: Oxford University Press. Retrieved 12 10, 2015, from <http://www.cep.ucsb.edu/papers/pfc92.pdf>
- Tredway, L. (1995). "Socratic Seminars: Engaging Students in Intellectual Discourse." *Educational Leadership*, 53 (1), 26-29.
- Treffers-Daller, J. (2013). Measuring lexical diversity among L2 learners of French: an exploration of the validity of D, MTLD and HD-D as measures of language ability. In S. & Jarvis, *Vocabulary knowledge: human ratings and automated measures*. (pp. pp. 79-104). Amsterdam: Benjamins .
- Tréville, M.-C. (1990). *Rôle des congénères interlinguaux dans le développement du vocabulair réceptif*. Ph.D. Dissertation. Montreal: Université de Montreal.
- Trivers, R. (1972). Parental investment and sexual selection. In B. Campbell, *Sexual selection and the descent of man, 1871-1971* (pp. 136–179). Chicago: Aldine.
- Trochim, W. (2006). *Qualitative Validity*. Retrieved 1 3, 2015, from Research Methods Knowledge Base: <http://www.socialresearchmethods.net/kb/qualval.php>

- Trussel, D. (1977). "Exhibitions," *Art New Zealand*, 6 (Winter).
- Tse, L. (1989). *Tao te Ching*. (G.-F. F. English, Trans.) New York: Vintage Books.
- Tseliou, E. (2013). A Critical Methodological Review of Discourse and Conversation Analysis Studies of Family Therapy. *Family Process*, 52 , 653–672.
- Turner, J.H. ; Cinta, R. (2013). The Evolutionary Logic of Organizational Citizenship. *Proceedings of Academy of Organizational Culture, Communications and Conflict*. 18(2), pp. 36-42. San Antonio: Allied Academies International Conference.
- Tze, V.M.C.; Klassen, R.M.; Daniels, L.M. (2014). Patterns of boredom and its relationship with perceived autonomy support and engagement. *Contemporary Educational Psychology*, 39(3), 175-187.
- Ulanowicz, R. (1997). *Ecology: the ascendent perspective*. New York: Columbia University Press.
- Underhill, N. (1987). *Testing Spoken Language: a handbook of oral testing techniques*. Cambridge: Cambridge University Press.
- Underhill, R. (1988). Like Is, Like, Focus. *American Speech*, 6(3), 234-46.
- UNESCO. (2012). *Culture: A Driver and an Enabler of Sustainable Development, Thematic Think Piece*. UN System Task Team Post-15 UN Development Agenda. Retrieved 12 31, 2015, from <http://www.projetcoal.org/coal/wp-content/uploads/2012/06/UNESCOCultureThink-Piece22-May-2012-3.pdf>
- van Dellen, M.R., Keith Campbell, W., Hoyle, R.H. and Bradfield, E.K. (2011). Compensating, Resisting, and Breaking: A Meta-Analytic Examination of Reactions to Self-Esteem Threat. *Personality and Social Psychology Review*, 15(1), 51-74.
- Van der Mescht, H. (2004). Phenomenology in education: A case study in educational leadership. *Indo-Pacific Journal of Phenomenology*, 4(1), 1-15.
- Van Egeren, L. (2009). A Cybernetic Model of Personality Traits. *Personality and Social Psychology Review*, 13(2), 92-108.
- van Kesteren, M.T.R.; Ruiters, D.J.; Guillen Fernandez & Henson, R.N. (2012). How schema and novelty augment memory formation. *Trends in Neurosciences*, 35(4), 211-219.

- Van Valen, L. (1973). A new evolutionary law. *Evolutionary Theory*, 1, 1-30.
- Varey, W. (2011). Viability of Psychological Panarchy: Thought as an Ecology. *Systems Research and Behavioral Science*, 8, 509–525.
- Vayda, a. (1961). Maori Prisoners and Slaves in the Nineteenth Century. *Ethnohistory*, 8(2), 144-155.
- Venville, G.J.; Wallace, J.; Rennie, L.J. & Malone, J.A. (2001). Curriculum Integration: Eroding the High Ground of Science as a School Subject? *Annual Conference of the Australian Association for Research in Education*. Fremantle: WA.
- Vlieghe, J. (2014). Laughter as Immanent Life-Affirmation: Reconsidering the educational value of through a Bakhtinian lens. *Educational Philosophy and Theory*, 148-161.
- Vonck, I., & Notteboom, T. (2015). Panarchy within a port setting. *Journal of Transport Geography*.
- Volk, T. (1995). *Metapatterns: Across Space, Time and Mind*. New York: Columbia University Press.
- Volk, T. & Bloom, J.W. (2007). Research into Complex Systems of Teaching, Learning, and Schooling. *Complicity*, 4(1), 25–43.
- Volk, T; Bloom, J.W. & Richards,J. (2007). Toward a science of metapatterns: building on Bateson's foundation. *Kybernetes*, 36(7/8), 1070-1080.
- vygotsky, L.S. (1978): *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, MA: Harvard University Press.
- Wagner, U.;Gais, S.; Haider, H., Verleger, R. & Born, J. (2004). Sleep inspires insight. *Nature*, 427(22 January), 352-355.
- Walton, Coyle & Lyon. (2004). Death and football: An analysis of men's. *British Journal of Social Psychology*, 43(3), 401-416. Retrieved 1 1, 2015, from <http://epubs.surrey.ac.uk/1702/1/fulltext.pdf>
- Watenea, K. & Yap, M. (2015). Culture and sustainable development: indigenous contributions. *Journal of Global Ethics*, 11(1), 51-55.

- Weiberg, E. (2012). What can Resilience Theory do for (Aegean) Archaeology? In F. F. N.M. Burström, *Matters of Scale: Processes and courses of events in archaeology and cultural history* (pp. 146-165). Stockholm: Stockholm University.
- Weinberg, S. (1993). *Dreams of a Final Theory*. London: Hutchinson Radius.
- Weiner, N. (1948,1965). *Cybernetics: of control and communication in animals and machines* (Kindle ed.). Cambridge, Massachusetts: The MIT Press.
- Weinstein, N., Legate, N. and Przybylski, A.W. (2013). Beauty is in the eye of the psychologically fulfilled: How need satisfying experiences shape aesthetic perceptions of spaces. *Motivation and Emotion*, 37(2), 245-260.
- Weinstock, M., Assor, A., & Broide, G. (2009). Schools as promoters of moral judgment: The essential role of teachers' encouragement of critical thinking. *Social Psychology of Education: An International Journal*, 12(1), 137-151. doi:Retrieved from <http://search.proquest.com.ezproxy.canterbury.ac.nz/docview/61911052?accountid=14499>
- Weiss, R. P. (2000). Emotion and learning. *Training & Development*, 54(11), 45-45.
- Wells, J. (2011, July 15). *nuh-nuh*. Retrieved from John Well's phonetic blog: <http://phonetic-blog.blogspot.co.nz/2011/07/nuh-nuh.html>
- Whewell, W. (1847). *Philosophy of the Inductive Sciences - Volume 2*. London: John W. Parker /Johnson Reprint Corporation.
- White, R. (2014). Lexical Richness in Adolescent Writing, insights fro the classroom: an L1 development vocabulary study. *Master of Arts Thesis - Applied Linguistics*. Victoria University of Wellington.
- White, T. (2010, November). The Savannah Hypothesis. *New*, 208(2785).
- White, T.D., Suwa, G., Asfaw, B., Yohannes H-S.; Lovejoy, C.O. Suwa, G.; & WoldeGabriel, G. (2009). *Ardipithecus ramidus* and the Paleobiology of Early Hominids. *Science*, 326 (5949), 75 - 64, 75-86.
- Wilber, K. (2011). *A Brief History of Everything* (Google eBook ed.). Boston, Massachusetts: Shambhala Publications.

- Wilkins, D. 1976. *Notional Syllabuses*. Oxford: Oxford University Press.
- Wilkinson, G. (1984). Reciprocal food-sharing in the vampire bat. . *Nature*, 308 , 181– 4.
- Wilson, D. S. (2012). Consilience Conference Celebrates Unity of Knowledge in Biology, Social Science, and Humanities. This View of Life, May 5. Online at <https://evolution-institute.org/article/consilience-science-and-the-humanities/>
- Wilson D.S, Kauffman R.A., & Purdy M.S. (2011) A program for at-risk high school students informed by evolutionary science. *PLoS One*. 6 (11) <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3218050/>
- Wilson D.S., Hayes S.C., Biglan A., & Embry D.D. (2014). Evolving the future: Toward a science of intentional change. *Behavioural and Brain Sciences*, 37, 395–460. doi:10.1017/S0140525X13001593
- Wilson, D. & Cartson, R. (2006). Metaphor, Relevance and the ‘Emergent Property’ Issue. *Mind & Language*, 21(3), 404–433.
- Wilson, D. S., Ostrom, E., & Cox, M. E. (2013). Generalizing the core design principles for the efficacy of groups. *Journal of Economic Behavior & Organization*, 90, S21–S32. doi:10.1016/j.jebo.2012.12.010
- Wilson, D.S. (2013, July 4). A good social Darwinism. *Aeon*. Retrieved 1 16, 2015, from <http://aeon.co/magazine/society/how-evolution-can-reform-economics/>
- Wilson, D.S. ; Hayes, S.C. ; Biglan, A. ; Embry, D. (2014). Evolving the Future: Toward a Science of Intentional Change. *Behavioral and Brain Sciences*, 37(4), 395–460.
- Wilson, E. (1975). *Sociobiology:the new synthesis*. Cambridge, Mass: Belknap Press of Harvard University Press.
- Wilson, E. (1978). *On Human Nature*. Cambridge: Harvard University Press.
- Wilson, E. (1994). *Naturalist*. Washington DC: Island Press/Shearwater Books.
- Wilson, E. (1998). *Consilience: the unity of knowledge*. London: Abacus.
- Wilson, E. (2006). *The Creation: an appeal to save life on earth*. New York, London: W.H.Norton.

- Wilson, E. (2012). *The Social Conquest of Earth*. New York: Liveright.
- Wilson, E. (2013). *Letters to a Young Scientist* (Kindle ed.). Liveright.
- Wilson, E. (2014a). Consilience: the role of human nature in the emergence of social artefacts. In F. W. Wayman, P. R. Williamson, & S. Polachek, *Predicting the Future in Science, Economics, and Politics* (pp. 45-54). Cheltenham, UK: Edward Elgar.
- Wilson, E. (2014b). *The Meaning of Human Existence* (Kindle ed.). Liveright.
- Wilson, E.O & Wilson, D.S. (2007). Rethinking the theoretical foundation of sociobiology. *Quarterly Review of Biology*, 82(4), 327–48.
- Wilson, E.O. & Hass, R. (2014). *The Poetic Species: A conversation with Edward Wilson and Robert Hass* (Kindle ed.). New York: Belleville Literary Press.
- Wilson, E.O. & Hass, R. (2014). *The Poetic Species* (Kindle Edition ed.). Bellview Library Press.
- Wilson, E.O. & Vargas, J. (2009). How the conversation occurred. In P. Naour, *E.O. Wilson and B.F Skinner: a dialogue between sociobiology and radical behaviourism* (pp. xvii-xix). New York: Springer.
- Wilson, E.O. ; Lumsden, C.L. (1981). *Genes, Mind, and Culture: The Coevolutionary Process*. Cambridge MA: Harvard University Press.
- Wilson, H.D. (1994). Regeneration of native forest on Hinewai Reserve, Banks Peninsula. *New Zealand Journal of Botany*, 32, 373-383.
- Wilson,, D.S. & Gowdy, J.M. (2013). Evolution as a general theoretical framework for economics and public policy. *Journal of Economic Behavior & Organization*, 90 (Supplement), Pages S3-S10.
- Winters, S. (2008). Aliens in the Landscape: Maori Space and European Time in Margaret Mahy's Fiction. 33(8), 408-425.
- Wood, D. (2010). *Formulaic language and second language speech fluency: Background, evidence and classroom applications*. Bloomsbury Publishing.

- Wolf, P. (2013). Exploring and contrasting EFL learners' perceptions of textbook-assigned and self-selected discussion topics. *Language Teaching Research*, 17(1), 49–66.
- Wolfe, C.R. & Haynes, C. (2003). Interdisciplinary Writing Assessment Profiles. *Issues in Integrative Studies*, 21(21), 126-169.
- Wong, B. (n.d.). Retrieved 12 29, 2015, from Brent Wong - Painter: <http://www.brentwong-painter.com/landscapes.php>
- Wong, J. & Zang Waring, H. (2010). *Conversation Analysis and Second Language Pedagogy*. Taylor and Francis.
- Wooffitt, R. (2005). *Conversation Analysis and Discourse Analysis* . London: Sage Publications Ltd .
- Wright, R. (1996). *The Moral Animal: Why we are the way we are*. London: Abacus.
- Yamamoto, D. (2000). *The Boundaries of the Human in Medieval English Literature*. Oxford Scholarship Online.
- Yin, R. (1994). *Case Study Research: Design and Methods*. (2nd ed.) . Thousand Oaks, California: Sage.
- Yin, R. K. (2013). *Case study research: Design and methods*. Sage publications.
- Yodzis, P. (2001). Must top predators be culled for the sake of fisheries? *Trends in Ecology and Evolution*, 16(2), 78-84.
- Yogeeswaran, T. & Leschi, C. (2015). *French in the Job Market: Places of Work in New Zealand Requiring French Language Skills. A report for the New Zealand Association of French Teachers*. Havelock North : New Zealand Association of French Teachers (NZAFT).
- Yu, G. (2010). Lexical Diversity in Writing and Speaking. *Applied Linguistics*, 31(2), 236-259.
- Zeki, S. (1999). *Inner Vision: An exploration of art and the brain*. Oxford: Oxford University Press.
- Zeki, S. (2000). Abstraction and idealism. *Nature*, 404(6778), 547.

- Zeki, S. (2001). Artistic Creativity and the Brain. *Science*, 293, 51-52.
- Zeki, S. (2002). Neural Concept Formation & Art Dante, Michelangelo, Wagner Something, and indeed the ultimate thing, must be left over for the mind to do. *Journal of Consciousness Studies*, 9(3), 53-76.
- Zhang, Q. (2014). Assessing the Effects of Instructor Enthusiasm on Classroom Engagement, Learning Goal Orientation, and Academic Self-Efficacy. *Communication Teacher*, 28(1), pp. 44-56.
- Zhang, J.W., Piff, P.K., and Iyer, R. (2014). Engagement with natural beauty moderates the positive relation between connectedness with nature and psychological well-being. *Journal of Environmental Psychology*, 38, 55-63.
- Zhang, J.W., Piff, P.K., Iyer, R., Koleva, S. and Keltner, D. (2014). An occasion for unselfing: Beautiful nature leads to prosociality. *Journal of Environmental Psychology*, 37, 61-72.
- Zimmerman, C. (2007). *The Descent of Man -and Selection in relation to Sex: The Concise Edition* (Kindle ed.). New York: Plume.
- Ziv, A. (1976). Facilitating effects of humor on creativity. *Journal of Educational Psychology*, 68(3), 318-322.
- Zussman, B. T. (1995). *"The Siguiriyas song form in flamenco guitar : a historical and comparative study"*. *Master's Theses*. San Jose State University, Music, San Jose. Retrieved 12 31, 2011, from http://scholarworks.sjsu.edu/etd_theses/1110

APPENDICES

Appendix 1: Unit of Work.....	341
Appendix 2: Selected Observational Notes & Teacher-Researcher Debrief Notes.....	405
Appendix 3: Ethics Documents.....	415
Appendix 4: Questionnaires.....	432
Appendix 5: Students Profiles.....	439
Appendix 6: Contribution to Lesson 9 from V. Burrows.....	447
Appendix 7: Glossary of Maori Terms.....	449
Appendix 8: Extracts for Chapter 5 Results 1.....	450
Appendix 9: Extracts for Chapter 6 Results 2.....	478

APPENDIX 1:

UNIT OF WORK

Draft Project Brief

Exploring Opportunities for Natural Science and Arts 'Consilience' through Level 8 French

- This unit is the result of consultation with the teacher of French at School #1 doctoral research student Ray Genet of the Christchurch College of Education under the supervision of Dr. Lindsey Conner and Dr. Elaine Mayo

Aim

- To provide senior French language students with the opportunity to develop skills to integrate diverse curriculum knowledge from natural science and the arts
- To connect students to global concerns
- To equip students them with training as interpreters and translators

Teaching

- All classes in this unit will be taught by the teacher

Monitoring

- Classes will be recorded and monitored for analysis and inclusion in the doctoral thesis of Ray Genet
- Thesis supervisors Deputy Pro-Vice-Chancellor Dr. Lindsey Conner and Lecturer Dr. Elaine Mayo of the Christchurch College of Education hope to observe weekly classes

Project Rationale

- It is widely thought that global environmental problems such as climate change are caused principally by society
- Solving these problems is interdisciplinary, requiring knowledge of the sciences and humanities

- It is acknowledged that the future problem solvers will be those who can move easily between the disciplines
- With its commitment to Ecological sustainability, Connectedness, and Lifelong Learning, the New Zealand Curriculum provides various avenues for the teaching and learning of the integration of the sciences and the arts known as ‘consilience’.
- In 2010 the RSNZ and TWACH merged in order that the sciences and arts may inform each other as it is already happening elsewhere in the world
- The study of languages at a senior level provides an opportunity for curriculum convergence.
- The broadness of Proficiency Descriptor and Achievement Objects provide opportunities critically treat a wide range of issues that could easily include both the environment, the creative arts and their merger
- Level 8 Proficiency Descriptor:

Express and justify their own ideas and opinions, and support and challenge those of others.

- Achievement Objectives for level 8 French classes are to:

Communicate information, ideas and opinions through increasingly complex and varied texts;

Explore views of others, developing and sharing personal perspectives;

Engage in sustained interaction and produce extended text

The Project

- This project aims to investigate how diverse curriculum areas can be interconnected through senior French.

The Topics

- Lesson 1: The first lesson will explore the aesthetic interest in nature in particularly birds; the focus will be on the medieval representation of birds. Main curriculum areas: French, Biology, History, Art History and Psychology
- Lesson 2: In the second lesson students will explore biological conservation and environmental movement in France as compared to that of New Zealand. Main curriculum areas: French, Biology and Social Studies:
- Lessons 3-5: In the remaining lessons students will explore the Ecological Restoration of Quail Island and communicate it for the French public. Main curriculum areas: French, Biology, New Zealand History and Media Studies

What will students do?

- Learn how to express their opinions, critique and write editorial style texts, podcasts

What will students produce?

- Discussion of the significance of the symbolism of birds in medieval art, and the bio-aesthetic meaning of their markings
- Editorial style article on the French environmental movement
- Brochure and Short podcast on the topic of Quail Island and bird reintroduction for the French audience

Lesson dates

Table 1.1 shows the lesson dates, theme of each lesson, who taught the class and the predominant language of instruction.

Lesson Number	Lesson date	Lesson Theme	Teacher	Language
1	17 May 2011	The Mystery of Courtly love	The Teacher French Assistant	French-English
2	24 May	Authentic French culture – José Bové – French environmental movement	The Teacher	French-English
3	31 May	Authentic landscapes – 100% Pure New Zealand advertising campaign	The Teacher	French-English
4	7 June	Otamahua/Quail Island flora and fauna	Participant - Researcher	French-English
5	17 June	Maori Spiritual Values of Otamahua/Quail Island	Rapaki Representative Participant – Researcher	French-English
Field Trip to Quail Island (Cancelled - earthquake)	19 June	Interviews with Quail Island experts – Students cancelled or did not attend.	Participant – Researcher	English
6	21 June	Pre-modern, Modern and Ecological postmodern world views	Participant – Researcher The Teacher	French -English

		Unit of Work Summary Instruction d for podcast		
7	23 June	Podcast preparation	The Teacher	English
8	27 June	Podcast preparation	The Teacher	English -French
9	28 June	Podcast preparation	The Teacher	English -French
10	30 June	Podcast preparation	The Teacher	English -French
11	1 July	Podcast preparation	The Teacher	English -French
12	4 July	Podcast preparation and recording	The Teacher French Assistant	English -French

Table 1.2 Unit Plan - Level 3 French

Class: Year 13	Subject: French	Curriculum Level: 8 NCEA Level: 3
Number of weeks: 5	Number of hours: 5	Rhythm: 1 lesson per week Tuesday 9:35 am
Proficiency Descriptor: Express and justify their own ideas and opinions, and support and challenge those of others.		
Achievement objectives: Communicate information, ideas and opinions through increasingly complex and varied texts e.g. use language variably and effectively for a range of purposes. Explore views of others, developing and sharing personal perspectives e.g. students can share and justify their own ideas and opinions and can support or question those of others for critical reflection Engage in sustained interaction and produce extended text, e.g. students can identify and use the linguistic and cultural forms that guide interpretation and enable them to respond critically to texts.		Overarching theme/s: The overarching theme is the connections between the sciences and the arts (called 'Consilience'), which is a cross over between the topics of Environmental Issues and Creative Arts for Level 8 French.
Learning Outcomes: At the end of the unit, the students will be able to use the structures and vocabulary to which they have been introduced and their knowledge of related socio-cultural aspects to communicate about:		

- the environment
 - creative arts
 - the connections between the natural science and the humanities
- with confidence, accuracy, fluency, and increasing flexibility in the specified contexts.

Possible community involvement:
Students will be given the task of critically interpreting the Quail Island Ecological Restoration project for the French audience in New Zealand. Students will meet Trust members and experts – botanist Colin Burrows, entomologist Mike Brodie, ornithologist Tina Troup and field worker Peter Heyward.
Students will create : Podcast for the Christchurch Alliance Francaise and Frogs in NZ

WEEK 1	Approximate homework hours: 1.0	Lesson type/s: Core (); Spiral ()
Achievement objective/s:		
<ul style="list-style-type: none"> • Communicate information, ideas and opinions through increasingly complex and varied texts • Explore views of others, developing and sharing personal perspectives 		
Possible socio-cultural aspect/s:		Possible topics:
<p>The medieval world view: the integration of religion, society, and nature; the study of nature was to experience the Mind of God. Medieval representation of nature, in particular birds in various French art works, including tapestries, manuscripts, and music.</p>		<ul style="list-style-type: none"> • Significance of Birds in French Medieval Art • Historic Explanation • The Mystery of Courtly Love
<ul style="list-style-type: none"> • Comments: <p>Language Production: Students discuss the significance of the symbolism of birds in medieval art, and the bio-aesthetic meaning of their markings</p>		

WEEK 2	Approximate homework hours:	Lesson type/s: Core (); Spiral ()
Achievement objective/s:		
<ul style="list-style-type: none"> • Explore views of others, developing and sharing personal perspectives e.g. students can share and justify their own ideas and opinions and can support or question those of others for critical reflection 		
Possible socio-cultural aspect/s:		Possible topics:
<p>Comparison with New Zealand conservation movement</p>		<p>French environmental movement</p>

	Activist: José Bové
Comments:	
Language production : Editorial style article on the French environmental movement	

WEEKS 3-5	Approximate homework hours:	Lesson type/s: Core (); Spiral ()
Achievement objective/s:		
<ul style="list-style-type: none"> • Communicate information, ideas and opinions through increasingly complex and varied texts e.g. use language variably and effectively for a range of purposes. • Explore views of others, developing and sharing personal perspectives e.g. students can share and justify their own ideas and opinions and can support or question those of others for critical reflection • Engage in sustained interaction and produce extended text, e.g. students can identify and use the linguistic and cultural forms that guide interpretation and enable them to respond critically to texts. 		
Possible socio-cultural aspect/s: Facilitation of the connecting the French community to local conservation project – conduct interviews with QIERT experts for the production of a French podcast on websites of <i>Alliance Francaise</i> and <i>Frogs in NZ</i>		Possible topics: <ul style="list-style-type: none"> • Quail Island Ecological Restoration • Translation • Making a podcast
Comments:		
Language Production: Students produce an information brochure and podcast on the topic of Quail Island and bird reintroduction for the French audience		

Table 1.3
Lesson 1

Arts and Science Integration through French

Case Study Lesson Plan – Draft 2

The Mystery of Courtly Love

Achievement objective/s

- Communicate information, ideas and opinions through increasingly complex and varied texts
- Explore views of others, developing and sharing personal perspectives

Intended outcomes

- Students will learn that to define the characteristics of courtly love and talk about its origins including historic, cultural and evolutionary sources.
- Through the example of courtly love, students will realize that a single subject can be treated by various disciplines
- Students will learn that courtly love is a possibly an expression of the Medieval world view of love, marriage, nature and God.

Thematic links between lessons

- The Medieval pre-modern person considered themselves one with nature and God
- In Lesson 2 students examine the modern contemporary French view of nature in the context of the environmental movement.
- In lessons 3-5 students investigate and interpret a nature conservation project – representing the ‘ecological postmodern’ world view, that is similar to the pre-modern one looked at in Lesson 1

Subsidiary aims

By the end of this lesson students will have practised:

- reading comprehension of a long text and practice
- paraphrasing key ideas
- communicating complex ideas to classmates
- critiquing a text
- giving opinions

Prior learning

Assumptions:

- The reading task is based in style and difficulty on Level 8 NCEA
- Students have already practised the language of paraphrasing, expressing opinions and critiquing a text.

Students are familiar with Home and Expert procedure, as follows:

1. Divide the class into 2 'home' groups
2. Each student will receive a different reading.
3. Now students move to join others that have the same reading as theirs – this is the 'Expert' group.
4. Students stay in the 'Expert' groups and read their text and answer the questions together.
5. Once the questions are answered they move back to their 'home' group and share the answers with their classmates.
6. Once all the questions are answered feedback is given to the class by the teacher and discussion is launched.

This technique generates an 'information gap' and gives students a reason to communicate in the target language.

Feedback is essential to ensure students have the correct answers and that they can share views, paraphrasing one another with classmates and teacher.

Lesson Type	Spiral lesson – focus on language practice
Skills focus	Reading and Speaking Reading for gist and comprehension Speaking to express opinions and to paraphrase expert points of view
Language elements	<p>Structures and Vocabulary: Level 3</p> <ul style="list-style-type: none"> • Concessive : <i>bien que</i> • Conditional : <i>à condition que, avant que, pourvu que</i> • Contrastive : <i>par contre, d'une part.d.autre part, tant...que, alors que,</i> • Expressing purpose : <i>afin que, pour que</i> • Resultative: <i>tout compte fait</i> • Causative: <i>a force de, a cause de, puisque,</i> • Sequencers : <i> finalement, puis, ensuite,</i> • Linking : <i> Si bien que , ainsi, il s'agit de , de quoi s'agit-il ?, à bien des égards,</i> • Adding information : <i> En outre, ,</i> • Clarifying : <i> C'est-à-dire,</i> • Citing : <i> Selon</i> <p>Verb forms</p> <p>Passive : <i> était emprisonné</i></p>
Language focus	<p>The primary focus of the lesson is to explain aspects of the texts, and ask for and give opinions about the texts</p> <ul style="list-style-type: none"> • Paraphrasing a text: <i> Selon l'auteur...</i> • Expressing opinions: <i> Il me semble que..., A mon avis.... Je</i>

	<p><i>suis sur que...</i></p> <ul style="list-style-type: none"> • Asking for opinions : <i>Je veux savoir ce que tu pense de...A ton avis,...</i> • Explanations : <i>à cause de, grâce à, parce que, comme, puisque, étant donne, c'est pour cette raison...</i> • Argumentation : <i>On peut noter que, Il est peu probable que, Il est certain que, Peut être, C'est pour cette raison,</i> •
Socio-cultural aspects	<p>Students are introduced to:</p> <ul style="list-style-type: none"> • the Medieval concept of courtly love • the medieval world view • the evolutionary psychological interpretation of courtly love as an expression of Darwinian sexual selection – the cross cultural common link for all artistic expression
Topics	Courtly love in French Medieval art and literature
Text types	<ul style="list-style-type: none"> • Online Medieval manuscript : <i>Aucassin et Nicolette</i> http://aucassinnetnicolette.d-t-x.com/ • Article – <i>Le mystère de l'amour courtois</i>
Learning and assessment activities	<p>Diagnostic assessment : Pre-reading homework task In the lesson before this unit students should be given the homework task attached. This involves the examination of 3 French medieval artworks; their task is to identify the common theme which is courtly love.</p> <ul style="list-style-type: none"> • Tapestry : <i>A Mon Seul Désir</i> (Musée du Moyen Age, Paris). • Ivory sculpture: <i>Le Siège du Château de l'Amour</i> (Le Louvre, Paris) • Online Medieval manuscript : <i>Aucassin et Nicolette</i> http://aucassinnetnicolette.d-t-x.com/ <p>Students are asked to express opinions supporting them with evidence.</p> <p>Formative Assessment</p> <ol style="list-style-type: none"> 1. Students express their understanding and critical appraisal of article to one another and then to their home groups and then to the class. Teacher should circulate, listen and give feedback. 2. During the class discussion students will get feedback from teacher on their responses both for content and language. 3. Students are invited to write a 150 word or more comment on the lesson blog giving their opinion of one aspect of the lesson: <ul style="list-style-type: none"> • Medieval courtly love and marriage compared to modern love and marriage • Darwinian interpretation of courtly love • The Medieval world view of nature • Any other
Monitoring strategies	Each student should be given a score for performance during the class and for their blog comments: N.A.M.E

Other support materials

Template from: http://www.tki.org.nz/r/language/support/french/planning/template-lesson_e.php

Classroom plan and seating arrangement for Lesson 1

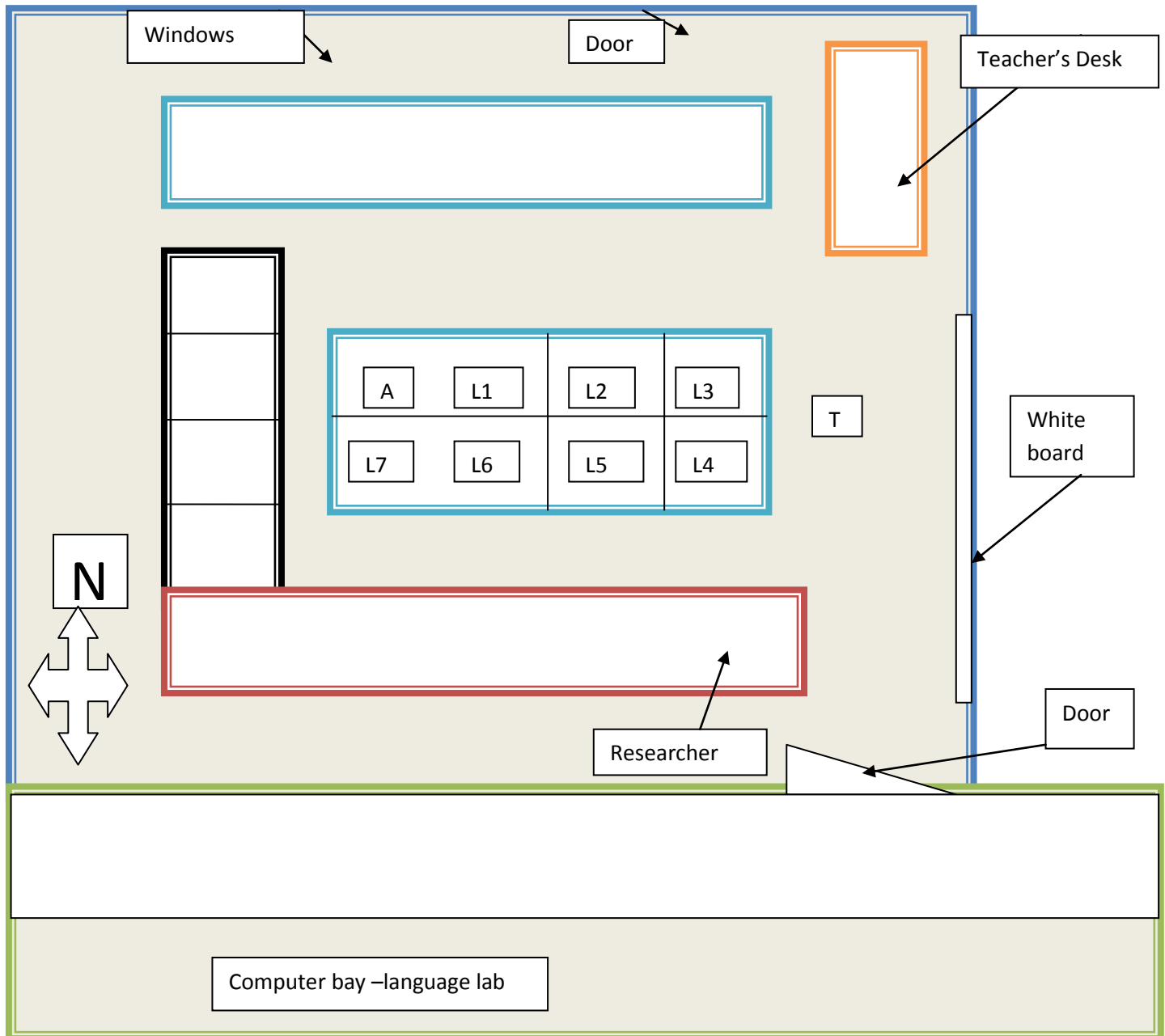


Figure 1.1 Classroom layout in School #1 Lesson 1 normal seating. Teacher introduces topic and gets homework feedback then gives her 'expert story' of courtly love A= French assistant, T= the teacher, L# = students

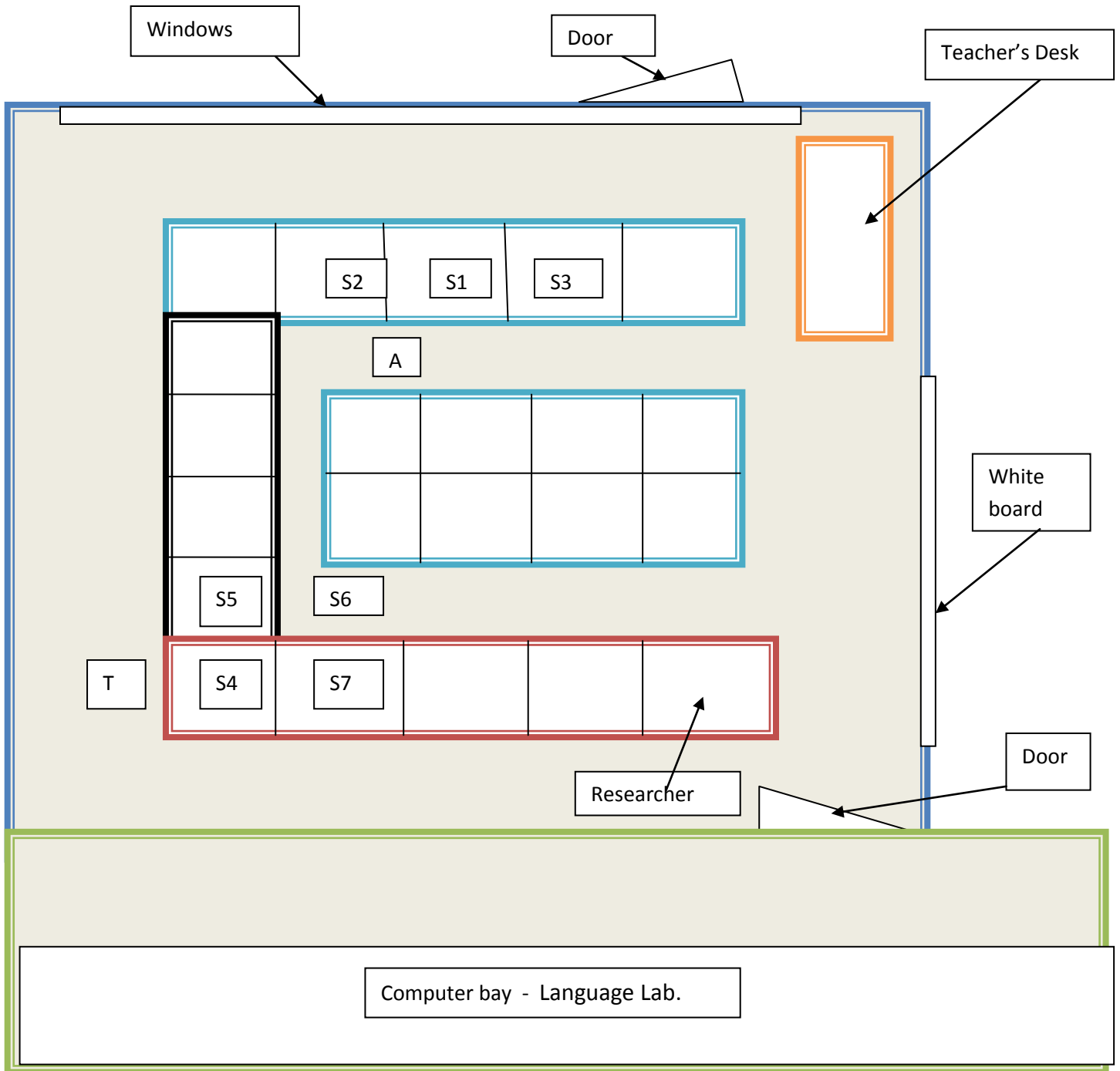


Figure 1.2 Classroom layout in School #1 Lesson 1, students in two groups red and translate one part of a two part text on courtly love. They answer questions in preparation for a class seminar where each group informs the other of their findings.

Lesson 1 Student handout

Le mystère de l'amour courtois

Dieu ne peut pas être vu à l'écart de la matière, et Il est vu davantage parfaitement dans la matière humaine que n'importe d'autres, et plus parfaitement encore dans la femme que dans l'homme.

Ibn Arabi

Homework preparation for 'Leçon 1'

Pré-lecture

Pour ton devoir tu as trois exemples de l'art du Moyen Age en France : une tapisserie, une sculpture et deux extraits d'un texte. Réponds aux questions qui suivent chaque chef d'œuvre et identifie le thème qui les réunit.

1. Regarde bien la tapisserie *La Dame et La Licorne* (Musée du Moyen Age (Cluny), Paris). Fais une liste des personnages et des animaux et indique ce qu'ils font.
2. Regarde aussi la sculpture *Le Siège du Château de l'Amour* (Le Louvre, Paris) et décris ce qui se passe.



La Dame et La Licorne



Le Siège du Château de l'Amour

3. Écrit dans le treizième siècle, la chantefable *Aucassin et Nicolette* (voir <http://aucassinnetnicolette.d-t-x.com/>) est une histoire d'amour. Feuillette le livre virtuel et essaie de comprendre l'histoire principale, ensuite lis les extraits suivants et réponds aux questions. Pour trouver les extraits, clique sur 'Visionner le diaporama' puis sur 'Table de matières' qui se trouve en bas de la page.

a) **Scène 15 Rencontre des amoureux**

A force de marcher, elle parvint à la tour où était emprisonné son ami. Nicolette se blottit contre un pilier. Elle entendit Aucassin qui, à l'intérieur, pleurait et s'abandonnait au désespoir. Elle commença à lui parler :

N: Aucassin, noble et valeureux seigneur, a quoi vous sert de vous lamenter, puisque jamais je serai à vous ? Votre père me hait; à cause de cela, je passerai la mer et me rendrai dans d'autres royaumes.

A: Ma très douce amie, vous ne partirez pas car ce serait me tuer

N: Ah! Je ne crois pas que vous m'aimiez autant que vous le dites, mais moi je vous aime davantage que vous m'aimez!

A: Allons donc il est impossible que vous aimiez autant que je vous aime car l'amour d'une femme réside dans son œil et tout au bout de son sein et tout au bout de son orteil, mais l'amour de l'homme est planté au fond de son cœur et n'en peut sortir.

Questions

- Pourquoi Nicolette a mis en doute la déclaration d'amour d'Aucassin ? Qu'est-ce qu'elle a à perdre s'il est en train de mentir ?
- Selon Aucassin les femmes ne peuvent pas aimer un homme aussi fort qu'un homme peut aimer une femme. Qu'est-ce que tu en penses ?
- SCENE 24. Découverte de la hutte de Nicolette**

Scene 24. The Discovery of Nicolette's hut

Il parvint au carrefour des sept chemins et vit la hutte que Nicolette avait construite avec des fleurs et des feuillages; elle était d'une beauté incomparable.

En descendant de cheval, il pensait tellement à Nicolette qu'il tomba lourdement sur une pierre et se démit l'épaule. Il se sentit sérieusement blessé, mais réussit à attacher son cheval à une aubépine et à se glisser sur le dos dans la hutte. Regardant par un trou de la hutte, il vit les étoiles dans le ciel.

L'une d'elles brillait plus que les autres ; il se mit à lui dire :

Quand Nicolette entendit Aucassin, elle vint à lui, car elle n'était pas loin. Elle entra dans la hutte et embrassa son ami, le serrant contre elle. Elle massa l'épaule qu'il avait démise, la palpa en tous sens, si bien que, selon la volonté de Dieu qui aime les amants, elle la remit en place. Ainsi fut-il complètement guéri.

Questions

- Pourquoi Nicolette se cache d'Aucassin dans la forêt ?
- Comment décrirais-tu le comportement de Nicolette vis-à-vis d'Aucassin ?
- Pourquoi penses-tu qu'elle se comporte comme cela ?

In class 'Home and Expert' Reading - The text explains courtly love from historic, cultural and evolutionary psychology perspectives.

Le mystère de l'amour courtois

Partie 1 : Caractéristiques et sources de l'amour courtois

Selon Kenneth Clark dans la tapisserie *A Mon Seul Désir* ou '*La Dame et L'Unicorne*' on voit le lion, qui symbolise la férocité, et l'unicorne qui représente le désir, tous les deux sont subjugués par l'amour pour une noble dame. La tapisserie démontre la puissance de la gentillesse et de la beauté, qui était des composants essentiels de l'amour courtois.

L'amour courtois était un sujet de la littérature et de l'art visuel très fréquent au Moyen Age. Il s'agit d'un amour entre des personnes de la noblesse, où l'homme fait sa cour à une dame souvent distante et parfois dédaigneuse ; cette cour pouvait durer une vie entière. Le sujet de cette cour rappelle, à bien des égards, la Vierge Marie elle-même. Selon Elaine Power :

'...l'affection liant des personnes mariées n'avait rien de commun avec le sentiment amoureux qui pouvait, et même devait, être recherché en dehors du mariage...' et l'amour courtois était *'... librement recherché et librement accordé;...*

La chantefable d'*Aucassin et Nicolette* présente les caractéristiques d'une histoire d'amour courtois. L'attitude de Nicolette vis-à-vis d'Aucassin est réservée et un peu hautaine ; elle teste non seulement la sincérité de son amour mais son intelligence et sa force physique avant de l'accepter. Elle a aussi une facette guérisseuse ; en récompense pour les efforts et ennuis d'Aucassin, dans un acte quasi miraculeux, elle soigne ses blessures.

L'amour courtois **commença** en Provence mais personne n'en connaît la source véritable. Selon des experts, elle était un mélange de plusieurs influences : la littérature Perse importée pendant les croisades comprenait des adorations hyperboliques pour les femmes ; pendant les croisades le seigneur était absent pendant plusieurs mois, voire des années, possiblement tué, laissant sa femme responsable du château avec des serviteurs et gardiens. La dame du château aurait pu être vue comme « disponible » pour être séduite par un chevalier errant (voir *Le Siège du Château de l'Amour*) ; finalement, c'est discutable si le culte de Marie a également joué un rôle.

Questions

1. Qu'est-ce que l'amour courtois ?
2. Les experts s'accordent à dire que l'origine de l'amour courtois est un mystère : explique ce qui est connu.

Partie 2 : L'amour courtois et la nature

- (1) En outre, il faut savoir que pour l'homme au Moyen Age, étudier la nature revenait à étudier l'esprit de Dieu. Il est possible que l'idée de l'amour courtois, soit inspiré en partie par la cour des animaux, et notamment celles des oiseaux.
- (2) Chez les oiseaux, le plumage de la femelle est généralement terne et son comportement est réservé pendant le période d'accouplement. Par contre, le mâle est très coloré et son plumage présente des motifs distinctifs qui rappellent des drapeaux et des uniformes.
- (3) La brillance de ses couleurs et la qualité de ses motifs sont indicateurs de sa santé et de sa capacité à trouver de la nourriture. Le rôle de la femelle, tant dans l'amour courtois que dans la cour des oiseaux, est un rôle réservé, d'observation et de sélection. Dans les deux cas, c'est au mâle de « convaincre » la femelle. Dans l'amour courtois, l'homme convainc sa belle avec son art et son intellect ; chez les oiseaux le mâle convainc la femelle avec son plumage et sa danse, tous deux indicateurs de sa *fitness*.



La paonne et le paon

- (4) Dans la cour humaine, est-ce la femme qui choisit l'homme ou l'homme qui choisit la femme ? Selon Charles Darwin, chez les êtres humains, c'est la femelle qui prend la décision finale, c'est-à-dire, c'est elle qui dit « oui ». Elle a ce rôle décisif parce qu'elle a beaucoup plus à perdre si elle prend la mauvaise décision ; en effet, l'investissement biologique est énorme chez les femelles par rapport aux hommes : le mâle n'apporte que sa semence alors que la femelle devra déployer toutes les forces de son corps et son avenir. En outre, le dimorphisme sexuel --c'est-à-dire, les différences physiques et mentales entre mâle et femelle-- est déterminé par les femelles ; tous les attributs physiques et mentaux du mâle actuel sont le résultat d'une évolution dirigée par les femmes : les hommes sont tels qu'ils sont à cause de, ou grâce aux femmes.
- (5) Tout compte fait, puisque l'homme doit tout aux femmes, l'adoration 'excessive' de l'amour courtois semble peut être, raisonnable.

Questions

1. Explique comment l'homme médiéval regardait la nature.
2. Selon l'auteur de l'article il y a peut être un lien entre l'amour courtois et la sélection sexuelle de Charles Darwin ; explique ce lien. Est-ce que tu es d'accord ? Explique ta réponse.

Bibliographie

Boase, R. (1977) *The Origin and Meaning of Courtly Love*. Manchester University Press. 171 p.

Clark, K. (1969) *Civilisation. The complete series [videorecording] : a personal view by Kenneth Clark* / BBC TV ; produced by Michael Gill and Peter Montagnon ; written by Lord Clark ; directed by Michael Gill, Peter Montagnon, Ann Turner.

Darwin, C (1871) *The descent of man: and selection in relation to sex*. London : John Murray

Lewis, C.S. (1958) *The Allegory of Love*. A Galaxy Book, Oxford University Press, 378 p.

Power, E (1979) *Les femmes au Moyen Age*, Editions Aubier Montaigne

Table 1.4
Lesson 2

Arts and Science Integration through French

Case Study Lesson Plan

The pursuit of authenticity

Achievement objective/s

- Communicate information, ideas and opinions through increasingly complex and varied texts
- Explore views of others, developing and sharing personal perspectives

Intended outcomes

- Students will learn that the diverse subjects of courtly love and the environmental crisis can be linked by exploring *world views* and the notion of *authenticity*.
- Through this they will use the ‘natural connections’ that exist between the Learning Areas
- Students will connect the Learning Areas to each other and to the Values of Ecological sustainability, Diversity, Equity and Respect

Thematic links between lessons

- The Medieval pre-modern person considered themselves one with nature and God. Sense of individuality did not exist
- In Lesson 2 students examine the notion of pre-modern and modern world views and how this relates to the environmental movement. Development of the sense of individuality and authenticity through loss of a sense of community
- In lessons 3-5 students investigate and interpret a nature conservation project – representing the ‘ecological postmodern’ world view, that is similar to the pre-modern one looked at in Lesson 1

Subsidiary aims

By the end of this lesson students will have practised:

- Formulating opinions about facial expressions- real/fake smiles
- Formulating opinions about New Zealand landscape paintings
- Listening comprehension
- Reading comprehension of a long text and practice
- Paraphrasing key ideas
- Communicating complex ideas to classmates
- Critiquing a text
- Giving opinions

Prior learning	<p>Assumptions:</p> <ul style="list-style-type: none"> • The reading task is based in style and difficulty on Level 8 NCEA • Students have already practised the language of paraphrasing, expressing opinions and critiquing a text. • Students are familiar with concept maps. Students are required to summarise their ideas using a concept map.
Lesson Type	Spiral lesson – focus on language practice
Skills focus	<p>Listening for gist and comprehension</p> <p>Reading and Speaking</p> <p>Reading for gist and comprehension</p> <p>Writing – key words as speaking prompts on concept map</p> <p>Speaking to express opinions</p>
Language elements	<p>Structures: Level 2</p> <p>Vocabulary:</p> <ul style="list-style-type: none"> • Conditional: <i>si</i> + imperfect tense, conditional present – « <i>Si j’osais Bove, je dirais...</i> » <p>Structures and Vocabulary: Level 3</p> <p>Vocabulary</p> <ul style="list-style-type: none"> • Oser (de) <p>Structures</p> <ul style="list-style-type: none"> • Articles: Definite article with body parts of speaker - « <i>Il se dore la praline.</i> » • Ce (marked form with être) (vs. il est) – c’est un homme remarquable – c’est un + adjective – [c’] est <i>un coriace</i> • Passive voice : « <i>Les fous de guerre sont décorés</i> » • Reflexive verbs : <i>il se retrouve en prison</i> • • Concessive : <i>bien que</i> • Conditional : à <i>condition que, avant que, pourvu que</i> • Contrastive : <i>par contre, d’une part.d’autre part, tant...que, alors que,</i> • Expressing purpose : <i>afin que, pour que</i> • Resultative: <i>tout compte fait</i> • Causative: <i>a force de, a cause de, puisque,</i> • Sequencers : <i> finalement, puis, ensuite,</i> • Linking : <i> Si bien que , ainsi, il s’agit de , de quoi s’agit-il ?, à bien des égards,</i> • Adding information : <i> En outre, ,</i>

	<ul style="list-style-type: none"> • Clarifying : <i>C'est-à-dire,</i> • Citing : <i>Selon</i>
	Verb forms
	Passive : <i>était emprisonné</i>
Language focus	The primary focus of the lesson is to explain aspects of the texts, and ask for and give opinions about the texts
	<ul style="list-style-type: none"> • Paraphrasing a text: <i>Selon l'auteur...</i> • Expressing opinions: <i>Il me semble que..., A mon avis.... Je suis sur que...</i> • Asking for opinions : <i>Je veux savoir ce que tu pense de...A ton avis,...</i> • Explanations : <i>a cause de, grâce a, parce que, comme, puisque, étant donne, c'est pour cette raison...</i> • Argumentation : <i>On peut noter que, Il est peu probable que, Il est certain que, Peut être, C'est pour cette raison,</i>
Socio-cultural aspects	Students are introduced to:
Topics	•
Text types	
Learning and assessment activities	<p>Diagnostic assessment :</p> <p>Homework task</p> <p>In the lesson before this unit students should be given the homework task attached. This involves the listening to the song for the Jose Bove's Presidential campaign of 2008. Focus is on gist, comprehension and vocabulary</p> <p>Students are asked to express opinions supporting them with evidence.</p> <p>Formative Assessment</p> <ol style="list-style-type: none"> 4. Students express their understanding and critical appraisal of article to one another and then to their home groups and then to the class. Teacher should circulate, listen and give feedback. 5. During the class discussion students will get feedback from teacher on their responses both for content and language. 6. Students are invited to write a 150 word or more comment on the lesson blog giving their opinion of one aspect of the lesson: <ul style="list-style-type: none"> • Medieval courtly love and marriage compared to modern love and marriage • Darwinian interpretation of courtly love • The Medieval world view of nature • Any other
Monitoring strategies	Each student should be given a score for performance during the class and for their blog comments: N.A.M.E
Other support materials	

Lesson 2 Student handout

Leçon 2

Pré-leçon lecture activité

José Bové est un personnage bien connu en France. Il était pendant plusieurs années militant activiste pour l'environnement. En 2007, il a été candidat aux élections présidentielles. Pour ton devoir, tu vas écouter la chanson de la campagne présidentielle de José Bové.

Suis le lien Youtube : <http://www.youtube.com/watch?v=6SfYoC1JmPw>

Écoute-la une ou deux fois avant de répondre aux questions de compréhension. Ensuite écoute-la à nouveau et rempli les blancs avec les mots que tu entends. Il y a quelques expressions, des mots et des références culturelles qu'il faut connaître ; ils sont en gras dans le texte et leurs explications se trouvent au-dessous des paroles.

Première écoute :

Quel est le genre musical de la chanson, du rap, du rai, du rock, etc. ?
Décris le caractère de José Bové?

Deuxième écoute :

Cette chanson a été écrite pour la campagne présidentielle de José Bové. La chanson cherche à le montrer comme quelqu'un de sincère, authentique, courageux, dédié à a cause anti-globalisation, écologique et politique ; enfin, c'est le héros des paysans opprimés. En écoutant et en lisant les paroles, trouve des exemples de sa sincérité, son authenticité, son courage.

La chanson commence par l'ironie – explique-la.

José Bové est un écologiste militant, selon la chanson il lutte contre quoi ?

Qu'est-ce que José Bové a fait à Millau ? Pourquoi crois-tu qu'il ait fait cela ?

Après avoir écouté la chanson :

Ce n'est pas mentionné dans la chanson mais José Bové est vu en tant qu'écologiste. Attention, *écologiste* / ecologist et écologie/ecology ne veulent pas forcément dire la même chose. Fais un peu de recherche sur l'internet pour savoir les différences. Voici un bon dictionnaire en ligne : <http://www.wordreference.com/>

Le philosophe grec Platon a dit que l'activité la plus avancée est de trouver les liens entre les idées pures. De la même façon, trouver des liens entre des sujets divers est aussi un défi, mais ce n'est pas impossible. Tu sais qu'il y a un lien thématique subtil mais fort entre le

mouvement écologiste français et l'amour courtois au moyen âge en France. **Peux-tu le trouver ?**

JOSE BOVE

par
Gustav Parking (né Pierre Le Bras)

Les fous de guerre sont décorés
Les fous de _____ sont enfermés

Elle est pour toi cette chanson
Toi le paysan qui sans façon
Un jour s'est retrouvé en _____

Si j'osais, José
Ah si j'osais, Bové
Je dirais dam de da de dam

Si j'osais, José
Ah si j'osais, Bové
Je dirais dam de da de dam

Je dirais donc José n'est pas mauvais

José Bové près de **Millau**
Eut la courante dans un Mac Do.
Les cornichons sont pas passés
Il est revenu le _____.

Ah ah, José Bové
Ah ah, a **du culot**

José Bové a vu pousser des **OGM** incontrôlés
Avec sa bande de gazelles, il les a mis à la poubelle
Ah ah, José Bové
Ah ah, est un _____

José Bové **passé en procès**, victime d'avoir trop bougé
Avec **ses potes** paysans ils font la fête comme les gitans

Ah ah, José Bové

Ah ah, est un _____

José Bové à la télé a vu son **audimat** _____

Mais quand il parle de la **malbouffe**

Il prétend que **c'est de l'esbroufe**

Ah ah, José Bové

Ne peut pas dire bouffe

Si j'osais, José

Ah si j'osais, Bové

Je dirais dam de da de dam

Ah si j'osais, José

Ah si j'osais, Bové

Je dirais donc José n'est pas mauvais

Oh... José Bové

José Bové en _____

Voulait **se dorer la praline**

Devant les tanks et les **bidasses**

La où ca pète et où ca casse

Ah ah José Bové

Ah ah est un **coriace**

José Bové a une _____

Qu'il **bourre** comme un métronome

Et même s'il se retrouve en **slip**

Sa pipe fait de lui un homme

Ah ah José Bové

Ah ah est un gaulois,

Toi José **le boute-en-train**

Arc-bouté sur ton destin

Dans ta prison tu **ronges** ton frein

Et ce soir je te serre la _____

Ah ah José Bové

Ah ah est un malin

C'est le _____ contre Goliath

Tu es **plastifie** face au pirate
Tu te frites contre des mutants
A coup de roquefort **dégoulinant**

Ah ah José Bové
Ah ah est épatant

Si j'osais, José
Ah si j'osais, Bové
Je dirais dam de da de dam
Ah si j'osais, José
Ah si j'osais, Bové
Je dirais donc José n'est pas mauvais

....Jose Bové

José Bové près de Millau,
eut la courante dans un Mac Do.
Les cornichons sont pas passés,
il est revenu le démonter.

Ah ah José Bové
Ah ah, a du culot,

José Bové a vu pousser des OGM incontrôlés
Avec sa bande de gazelles, il les a mis à la poubelle

Ah ah José Bové
Est un rebelle

...José...

Ah si j'osais, Bové
Je dirais dam de da de dam

Ah si j'osais, José
Ah si j'osais, Bové
Je dirais donc José n'est pas mauvais

...José Bové....

José Bové est épatant

On lèche, on lâche, on lâche

Y'a pas de rapport
Mais si un rapport de police

Vocabulaire, expressions et références culturelles par ordre d'apparition dans le texte :

Toi le paysan qui sans façon (Ce vers est un hommage à la chanson bien connue, 'Chanson Pour L'auvergnat', du chanteur iconique Georges Brassens (1921-1981); la chanson parle d'une acte de générosité par un pauvre homme en Auvergne.)

Millau (Ville dans le sud de la France, site du Viaduc de Millau – le plus gros pont du monde.)

Eut la courante... (Avoir la diarrhée)

Les cornichons sont pas passés (Les cornichons sont indigestes, il a vomi...)

A du culot (Avoir du courage)

OGM incontrôlés (Organisme Génétiquement Modifié)

Passe en procès (Va en justice)

Ses potes (Ses amis)

Audimat (Taux d'écoute à la télévision)

Malbouffe (Aliments qui contiennent des produits chimiques, pesticides, qui sont génétiquement modifiés...)

C'est de l'esbroufe (Il fait l'intéressant)

Se dorer la praline (Se faire bronzer)

Bidasses (Soldats)

Coriace (Dur)

Bourre (Remplit)

Slip (Culotte)

Le boute-en-train (Celui qui met une bonne ambiance dans une soirée)

Arc-bouté (L'expression dans ce contexte veut dire que José Bové est vraiment dédié à sa cause.)

Tu ronges ton frein (Tu attends avec impatience)

plastifié (Couvert de plastique. Il existe un *guignol* (une marionnette) José Bové dans l'émission de satire politique *Les Guignols de l'info.*)

te frites (Tu te bagarres)

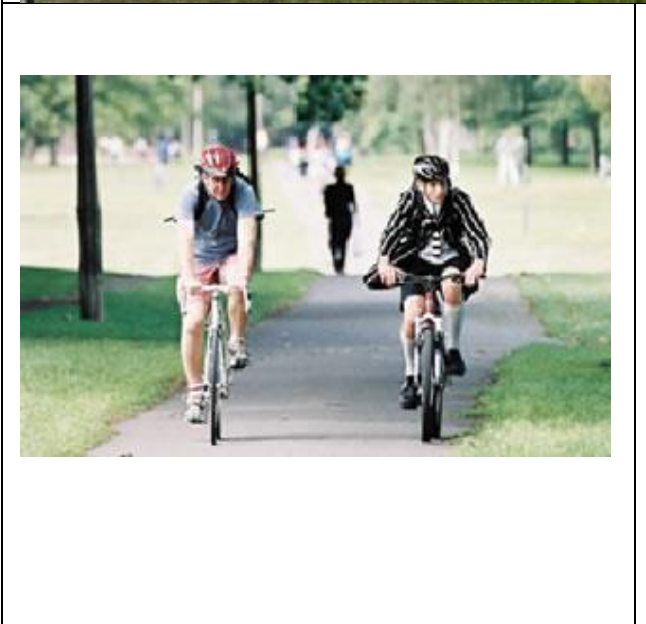
dégoulinant (Un fromage qui dégouline est un fromage qui coule.)

Lesson Starter

- Sais-tu distinguer un sourire authentique d'un sourire faux ? (synonymes : sourire forcé ou sourire contrôlé?)
- Suis le lien ci-dessous et fais le test
- <http://www.bbc.co.uk/science/humanbody/mind/surveys/smiles/>
- Regardez les paires d'images suivantes et décidez des deux, la quelle représente la vie la plus **authentique**.
- **Expliquez votre réponse**







Connexions à travers le temps et les idées

Partie 1

Le lien entre l'amour courtois du Moyen Age et le mouvement écologiste français est une étude des concepts de *vision du monde* et d'*authenticité*.

Mais tout d'abord, qu'est-ce c'est qu'une *vision du monde* ? Simplement, c'est une façon de voir le monde et notre place vis-à-vis de la nature, la société, etc. Par exemple, as-tu un sentiment d'appartenance avec la société et la nature ; peux-tu dire que tu te considères comme un individu à part, ou plutôt comme faisant partie de la communauté ou de la nature ?

Ensuite, qu'est-ce que l'authenticité ? Pour y répondre il faut parler de la période pré-moderne, et précisément du Moyen Age ; à cette époque, l'homme se voyait en unité avec la société, la nature et Dieu – les gens avaient un sentiment **d'appartenance** et la notion d'individualité n'existait pas.

L'amour courtois appartient à cette période et c'est une expression de cette vision du monde. L'amour courtois est le produit de plusieurs sources historiques, religieuses, culturelles et possiblement d'observations de la nature. Au Moyen Age, ce genre d'amour est une expression de l'authenticité ou de l'unité avec la société, la nature et Dieu.

Mais quel rapport avec le mouvement écologiste français et l'authenticité ? Pour trouver la réponse il faut avancer dans le temps et quitter le période pré-moderne.

La période moderne a commencé avec l'apparition de la science, entre le quinzième et le dix-septième siècle. A partir de cette époque, l'homme se voit comme *séparé* de la nature et de la société en général ; il devient un *individu*, un observateur et un manipulateur de la nature. Selon Lionel Trilling, à partir du moment où les gens se voient comme des individus, ils ont l'impression que la réalité leur manque, leur échappe, et que leur vie est inauthentique.

Beaucoup d'écologistes s'accordent à dire qu'une des raisons clés pour la crise environnementale est cette séparation entre l'être et la nature. La nature est vue comme quelque chose qu'on peut étudier et conquérir. Dans un sens, on peut dire que la science a créé l'individualisme et, avec elle, le sentiment d'inauthenticité.

Que faire pour trouver un remède à cette situation ? L'un des buts du mouvement écologiste et du développement durable est de vivre plus en harmonie avec la nature, c'est-à-dire, vivre une vie plus authentique.

Partie 2

Mais à quoi correspond le fait de qualifier quelque chose, quelqu'un ou un lieu d'authentique ?

En fait les choses, les idées, les peuples, les personnages qu'on considère authentique nous permettent effectivement d'entrer en connexion avec eux.

Par exemple, un vrai sourire peut déclencher une connexion positive avec la personne. Par contre, un sourire faux c'est un 'turn off', on ressent le mensonge, la tricherie, la contrefaçon, cela coupe notre intérêt et notre potentiel d'investir du temps avec ces personnes et ces idées ; on reste donc déconnecté.

Les produits et coutumes issus de la tradition servent à préserver le caractère authentique d'un pays, ce qui encourage le désir pour ces marchandises et le tourisme. Si l'on voit un Mac Do partout où l'on voyage, à quoi ça sert à voyager ? José Bové affirme que la malbouffe et les fast food contribuent à la dégradation de la coutume de manger en famille, assis autour d'une table ; ces modes alimentaires brisent les relations familiales.

En France, l'Académie Française est chargée de préserver l'authenticité de la langue française contre l'invasion des mots anglo-saxons. Par exemple, *email* est maintenant devenu *mél*. Au Québec, l'anti anglicisme est encore plus féroce : *hot dog* devient *chien-chaud* et les panneaux *Stop* sont transformés en *Arrêt*.

De la même façon, au niveau de la conservation de la Nature on est naturellement plus inspiré par Milford Sound que par Hagley Park. A Milford Sound, l'authenticité de la nature peut déclencher l'émotion et avoir un pouvoir transformateur ; on peut en effet s'y sentir en connexion avec la Terre.

Partie 3

Mais est-ce que ce désir d'authenticité est réalisable ?

Considère les points suivants :

Quand les populations se rencontrent pour le commerce, le tourisme, la guerre... il y a des échanges culturels et linguistiques. Sur la Route de la Soie, l'art de l'Asie a influencé l'Europe.

Les langues sont comme les espèces, dit Darwin dans *Descent of Man*, elles évoluent, forment des hybrides et disparaissent. Qui peut lire un texte original de Shakespeare sans commentaire – ou essayer de comprendre un texte de Français du Moyen Age ? (Voir *Auccasin et Nicolette*).

La directive principale du Département de Conservation de l'Environnement en Nouvelle-Zélande est de préserver et restaurer ce qui représente la nature authentique.

Ce désir est un rêve : restaurer la flore et la faune telles qu'elles étaient en 1840 est largement impossible du fait que beaucoup d'espèces ont disparu, d'autres sont arrivées, soit importées exprès, soit par hasard. En réalité, le *biote** actuel en Nouvelle-Zélande est à 50% exotique/50% indigène, ce qui est irréversible. Et avec le changement climatique, qui sait quel biote sera le plus adapté au monde dans le futur ?

Devoirs

- Lis *Parties 2 et 3*. Est-ce tu es d'accords avec analyse du auteur ? Écris un article entre 150-200 mots pour exprimer ton opinion. Tu peux publier ton commentaire sur le site suivant : XXXXXXXXX
- Compose des questions en anglais pour ton entretien avec les experts de l'Île aux Cailles

* biote : Terme de biologie. Représente la somme de la faune et de la flore vivant dans une région donnée.

Table 1.5
Lesson 3

Arts and Science Integration through French

Case Study Lesson Plan : 'The Savannah Hypothesis'

Achievement objective/s

- Communicate information, ideas and opinions through increasingly complex and varied texts
- Explore views of others, developing and sharing personal perspectives

Intended outcomes

- Students will learn that:
 - From Year 13 biology modern humans evolved in Africa. From evidence of mitochondrial DNA we are all the descendents of a single female from that continent – we are all Africans
 - Humans have a mental model of their ancestral landscape – the African savannah
 - Humans naturally gravitate towards savannah landscapes or produce them through deforestation
 - The artists' view of many landscapes of the east coast of the South Island of New Zealand reveal their barrenness and may not meet our inherited ideal vision of a landscape – it is more like a desert – the way New Zealand is can only make us want to seek 'greener pastures'
 - Comparative environmental quality in New Zealand is due to its geographical isolation and small population relative to land area
 - It is arguable that New Zealand is both deluded and tries to delude other countries into thinking it is clean and green – government environmental policy is advanced in comparison to other countries but the reality is that it is the second worst in the world in terms of deforestation
 - New Zealand presents a false image of itself – it is like a fake smile – inauthentic – and this may generate a sense of loss of a sense of belonging – leading to the pursuit of the authentic elsewhere
 - The French are interested in the environment in relation to how it will affect the lives of their children in the future
 - For the French, economic and environmental security are related and equivalent
 - The French are most concerned about global warming
 - Loss of forests – exacerbates global warming
 - Reforestation as an investment in the security of the family in the future
 - Conservation biology is interdisciplinary and can be thought of at multiple levels from visual art, psychology and biology
 - the diverse subjects of courtly love and the environmental crisis can be linked by exploring *world views* and the notion of *authenticity*.
 - Through this they will use the 'natural connections' that exist between the Learning Areas

-
- Students will connect the Learning Areas to each other and to the Curriculum Values of Ecological Sustainability, Diversity, Equity and Respect

Thematic links between lessons

- The Medieval pre-modern person considered themselves one with nature and God. Sense of individuality did not exist
- In Lesson 2 students examine the notion of pre-modern and modern world views and how this relates to the environmental movement. Development of the sense of individuality and authenticity through loss of a sense of community
- Lesson 3 treats the theme of authenticity in terms of landscape, and the claims of the ‘100% Pure New Zealand’ advertising campaign. The NZ landscape is compared to the ancestral savannah and the paintings of artists such as Colin McCahon and Brent Wong. In the advertising campaign NZ is presented as genuine, innocent and pristine. Students critique the validity of these pretensions. Student must find a way to present the Quail Island Ecological Restoration Project to the French public in the light of the reality of the poor state of the environment and the ad campaign. Students are faced with an ethical dilemma.
- In lessons 3-5 students investigate and interpret a nature conservation project – representing the ‘ecological postmodern’ world view, that is similar to the pre-modern one looked at in Lesson 1

Subsidiary aims

By the end of this lesson students will have practised:

- Formulating opinions about New Zealand landscape paintings
- Listening comprehension
- Reading comprehension of a long text and practice
- Paraphrasing key ideas
- Communicating complex ideas to classmates
- Critiquing a text
- Giving opinions

Prior learning

Assumptions:

- The reading tasks are based in style and difficulty on Level 8 NCEA
 - Students have already practised the language of paraphrasing, expressing opinions and critiquing a text.
 - Students should be able to recognize cognates used in texts
-

Lesson Type	Spiral lesson – focus on language practice
Skills focus	Listening for gist and comprehension Reading and Speaking Reading for gist and comprehension Writing – key words as speaking prompts on concept map Speaking to express opinions
Language elements	Structures: Level 3 Vocabulary: <ul style="list-style-type: none">• Conditional: <i>si</i> + imperfect tense, conditional present – « <i>Si j’osais Bové, je dirais...</i> » Structures and Vocabulary: Level 3 Vocabulary <ul style="list-style-type: none">• Oser (de) Structures <ul style="list-style-type: none">• Articles: Definite article with body parts of speaker - « <i>Il se dore la praline</i> »• Ce (marked form with être) (vs. il est) Passive voice :• Reflexive verbs :• Concessive : <i>bien que</i>• Conditional : <i>à condition que, avant que, pourvu que</i>• Contrastive : <i>par contre, tant...que, alors que,</i>• Expressing purpose : <i>afin que,</i>• Resultative: <i>tout compte fait</i> • Causative: <i>a force de, a cause de, puisque,</i> • Sequencers : <i> finalement, puis, ensuite,</i> • Linking : <i> Si bien que , ainsi, il s’agit de , de quoi s’agit-il ?, à bien des égards,</i> • Adding information : <i> En outre, ,</i> • Clarifying : <i> C’est-à-dire,</i> • Citing : <i> Selon</i> Verb forms Passive : <i> était emprisonné</i>
Language focus	The primary focus of the lesson is to explain aspects of the texts, and ask for and give opinions about the texts

	<ul style="list-style-type: none"> • Paraphrasing a text: <i>Selon l'auteur...</i> • Expressing opinions: <i>Il me semble que..., A mon avis.... Je suis sur que...</i> • Asking for opinions : <i>Je veux savoir ce que tu pense de...A ton avis,...</i> • Explanations : <i>a cause de, grâce a, parce que, comme, puisque, étant donne, c'est pour cette raison...</i> • Argumentation : <i>On peut noter que, Il est peu probable que, Il est certain que, Peut être, C'est pour cette raison,</i> •
Socio-cultural aspects	Students are introduced to: <ul style="list-style-type: none"> •
Topics	
Text types	
Learning and assessment activities	<p>Diagnostic assessment : Homework task In the lesson before this unit students should be given the homework task attached. This involves the listening to the song for the Jose Bove's Presidential campaign of 2008. Focus is on gist, comprehension and vocabulary Students are asked to express opinions supporting them with evidence.</p> <p>Formative Assessment</p> <ol style="list-style-type: none"> 7. Students express their understanding and critical appraisal of article to one another and then to their home groups and then to the class. Teacher should circulate, listen and give feedback. 8. During the class discussion students will get feedback from teacher on their responses both for content and language. 9. Students are invited to write a 150 word or more comment on the lesson blog giving their opinion of one aspect of the lesson: <ul style="list-style-type: none"> • Medieval courtly love and marriage compared to modern love and marriage • Darwinian interpretation of courtly love • The Medieval world view of nature • Any other
Monitoring strategies	Each student should be given a score for performance during the class and for their blog comments: N.A.M.E
Other support materials	

Template from: http://www.tki.org.nz/r/language/support/french/planning/template-lesson_e.php

Lesson 3 Worksheet

Lesson 3 Student handout

Leçon 3

« 100% Pure New Zealand »

- **L'authenticité de la Nouvelle-Zélande en tant que site touristique**
- **La prise de conscience**
- **On cherche à faire les étudiantes de prendre conscience de l'état réel de l'environnement en Nouvelle-Zélande**

Pré-leçon tache

Sans discuter avec tes camarades de classe, dans ton journal, et à partir de ton imagination, fais un croquis de ton paysage idéal. Dans le dessin ajoute ta maison. Décris ce que tu as dessiné ; qu'est-ce que tu as mis devant et derrière la maison ? Pour notre prochaine leçon (vendredi 3 juin) sois prête à présenter ton dessin en classe.

Vocabulaire :	
première plan	
deuxième plan	
troisième plan/arrière-plan	

Leçon 3 : Partie 1

Starter

1. En classe compare ton dessin avec ceux de tes camarades de classe
2. Ensuite, regarde les dessins faits par les étudiants de l'École Supérieure d'Architecture à Grenoble (ENSAG)
3. Ensuite, trouve des similitudes et des différences
4. Essaie d'expliquer les résultats de l'exercice 3

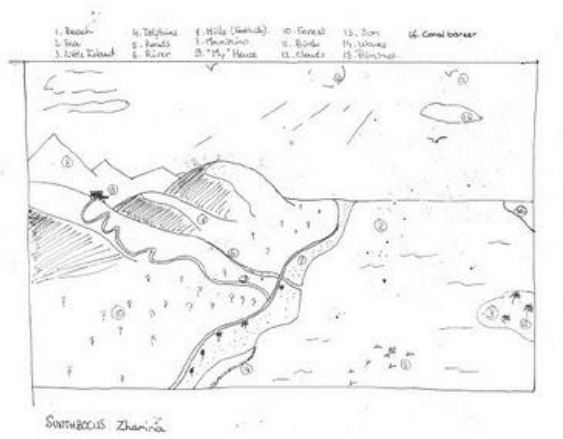


Figure 1



Figure 2

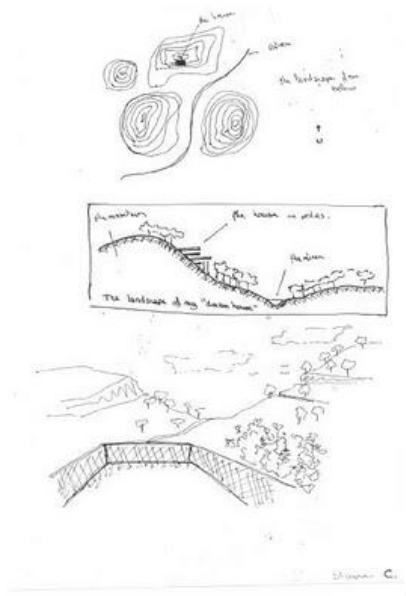


Figure 3



Figure 4

5. Maintenant compare tes explications à celles qui sont proposées dans le texte suivant :

Selon les recherches de la psychologie évolutionnaire, en dépit des différences culturelles, la plupart des croquis de ces paysages idéaux suit un motif similaire; voici les caractéristiques suivantes :

- La maison est souvent placée sur un plan élevé
- La maison donne sur une savane avec des bosquets (des arbres en groupe) et des arbres individuels clairsemés
- Près de la maison il y a un plan d'eau ; c'est-à-dire, un lac, une rivière ou la mer
- La maison est un refuge ; derrière l'habitation se trouve une structure solide comme une falaise
- Le paysage devant la maison est fructueux : on voit des animaux domestiques et sauvages
- Les arbres ont des branches assez basses et horizontales; leurs feuilles sont pennées (voir Figure 1 ci-dessous)



Figure 5. Des feuilles pennées de l'arbre natif, le titoki (*Alectryon excelsum*)

Discussion:

1. Peux-tu trouver une explication à ce phénomène ? Avec tes camarades de classe fais un « brain-storming » (remue-méninges).
2. Compare tes idées avec celles de la psychologie évolutionnaire. Est-ce que tu es d'accord ? Explique ta réponse.

L'hypothèse de la savane

Les étudiantes de 13e année de biologie sauront que selon l'évidence d'ADN de la mitochondrie, les êtres humains modernes, comme toi et moi, descendent tous d'une seule et même femelle d'Afrique ; c'est-à-dire qu'à la base on est tous des africains.

A cause de la compétition et suite à un changement climatique nos ancêtres ont quitté l'Afrique pour coloniser le reste de la planète.

Notre habitat ancestral préféré a été la savane (Figure 5); les plaines riches en gibier, avec des bosquets et des arbres clairsemés.

Non seulement nous préférons la savane à voir de nos fenêtres mais on la crée pratiquement partout où se trouve les êtres humaines. Ce paysage par le déboisement, et celui-ci a des conséquences graves pour la santé de notre planète.

Dans les pays tempérés comme la Nouvelle-Zélande le déboisement humain crée la savane

Notre corps est bien adapté à ce genre de paysage ; le fait d'être bipède a libéré nos bras pour affourager, porter des armes et lancer des pierres ; le fait de se tenir debout a été un moyen de régler la température du corps et aussi de voir des prédateurs.

Les groupes d'arbres servaient à des cachettes afin que les chasseurs puissent se dissimuler des animaux, et les plans d'eau étaient non seulement une source de nourriture mais servaient à délimiter les territoires humains.

L'habitation idéale a été posée stratégiquement sur une colline : blottie contre la côte, la maison est inaccessible aux attaques par l'arrière ; devant, la maison donnait sur la savane, permettant aux occupants de la surveiller.



Figure 6. La savane africaine

Pour résumer le texte, selon des psychologues évolutionnaires notre tendance à préférer la savane de nos ancêtres est innée ; c'est l'un des héritages génétiques.

Partie 2 : Comment les artistes néo-zélandais voient leur pays

Regarde les tableaux suivants et dis ce que tu ressens. Est-ce qu'ils sont conformes à ton paysage idéal ? Explique ta réponse.



Figure 7. *Six days in Nelson and Canterbury*, 1950 (Six jours à Nelson et en Canterbury) de Colin McCahon

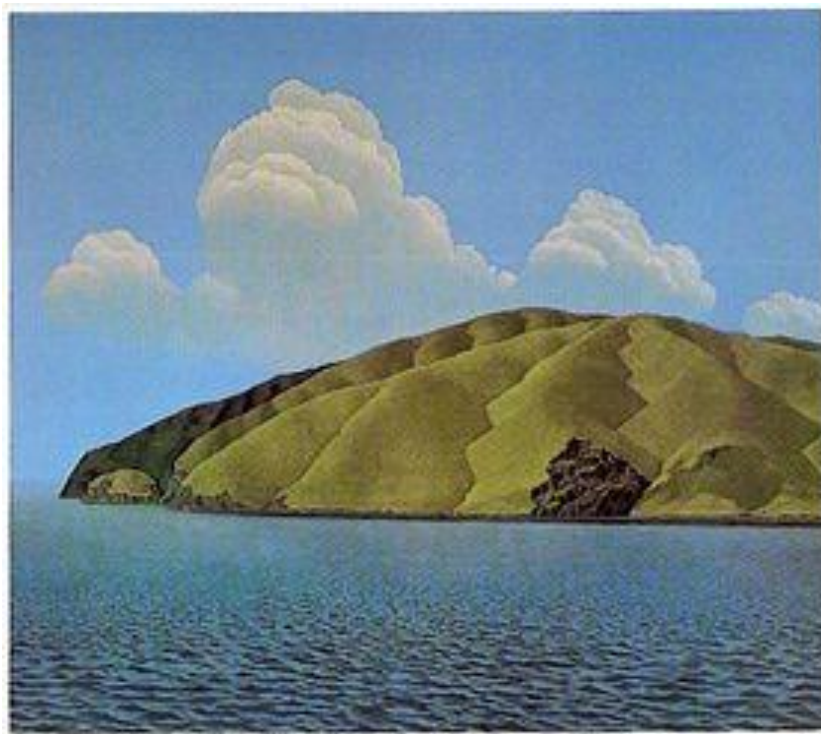


Figure 8. *Waves, Coast, Clouds, Sky* (Vagues, côte, nuages, ciel) de Brent Wong



Figure 9. *Building with Green Roof* (Bâtiment à toit vert) de Brent Wong



Figure 10. *French Hill* (Colline Française) de Diana Adams (2009)



Figure 11. *Lyttelton Harbour Nor'wester* (Le Vent de Foehn au Port de Lyttelton) de Diana Adams (2010)



Figure 12. Canterbury Telephone Book Cover 2010 (l'Annuaire Téléphonique de Canterbury) de Jane Harper



Figure 13. *Vanishing Point* (Le Point de Fuite) de Maryrose Crook (2010)

Partie 3 : Comment la Nouvelle-Zélande se vend en Europe

En octobre 2009, le Ministère du Tourisme (Tourism New Zealand) a lancé une campagne publicitaire en Europe qui comprenait la France. La publicité, qui dure à peu près 30 secondes, a été diffusée dans 800 cinémas en région parisienne. Regarde bien cette pub et réponds aux questions qui suivent :

<http://www.youtube.com/watch?v=ulnV1k4AGO4>

- a) Complète le titre de la pub : _____ en Nouvelle-Zélande, le dernier _____ Monde
- b) Quelles prétentions sont faites par la phrase: *le dernier nouveau monde*?
- c) Quel est le **slogan publicitaire** ?
- d) Quelles prétentions sont faites par le slogan ?
- e) Quel est le titre de la chanson de la pub ?
- f) Quelles prétentions sont faites par le titre de la chanson ?
- g) En gros la pub prétend que la Nouvelle-Zélande est
- h) Est-ce que tu es d'accord avec cette image de la Nouvelle-Zélande envoyée au monde. Explique ta réponse.

Partie 4 : Comment la Nouvelle-Zélande est vue par les Européens ?

Commençons avec un entretien avec le premier ministre de la Nouvelle-Zélande, John Key. A Londres pour le mariage royal cette année, John Key a été interviewé par Stephen Sackur, journaliste de la BBC. Écoute cet extrait de trois minutes et réponds aux questions qui suivent. L'entretien sera en anglais mais les questions et tes réponses seront en français.

- Travail en équipe de 2 ou 3.
- Chaque groupe est responsable pour une question, soit a) ou b)
- Dès que ton groupe a terminé sa réponse, partage-la avec l'autre groupe
- Ensuite ensemble, avec l'autre groupe, discute des questions c) et d)

Youtube: http://www.youtube.com/watch?v=c3yFiNk_Ufw&feature=related

- Écris un résumé de l'argument du journaliste Stephen Sackur, et traduis-le en français. Pour t'aider la transcription de son entretien se trouve ci-dessous
- Écris un résumé de la réponse de John Key et traduis-le en français. Pour t'aider la transcription de son entretien se trouve ci-dessous

Discussion en classe

- A ton avis, pourquoi les plans d'eau à faible altitude en Nouvelle-Zélande sont pollués ?
- Selon toi, pourquoi John Key refuse d'avouer que nos lacs et rivières sont pollués ?

BBC Hardtalk–John Key est interviewé par Stephen Sackur - Transcription

Stephen Sackur: One of the country's unique selling points, and your advertising slogan was all about this, was "100% Pure New Zealand", the idea that you're a greener nation than any other in the developed world – that already isn't true, as your population does slowly rise, and it's going to get worse. Dr Mike Joy, of Massey University, a leading environmental scientist in your country, said just the other day, "We are delusional about how clean and green we are."

John Key: Well that might be Mike Joy's view, but I don't share that view.

Sackur: But he is very well qualified, isn't he? He's looked, for example, at the number of species threatened with extinction in New Zealand, he's looked at the fact that half your lakes, 90% of your lowland rivers, are now classed as polluted.

Key: Look, I'd hate to get into a flaming row with one of our academics, but he's offering his view. I think any person that goes down to New Zealand ...

Sackur: Yeah but he's a scientist, it's based on research, it's not an opinion he's plucked from the air.

Key: He's one academic, and like lawyers, I can provide you with another one that will give you a counterview. Anybody who goes down to New Zealand and looks at our environmental credentials, and looks at New Zealand, then I think for the most part, in comparison with the rest of the world, we are 100% pure – in other words, our air quality is very high, our water quality is very high

Sackur: But 100% is 100%, and clearly you're not 100% ... Look whether you agree with Mike Joy's figures or not, you've clearly got problems of river pollution, you've clearly got problems with species which are declining, threatened with extinction, and if he says the problem is, he's not just blaming you, the problem is that central government in New Zealand has been complacent about this so what are you going to do about it?

Partie 5 (facultative)

Mets les déclarations suivantes avec leurs traductions en anglais

Partie 6

Déchet ou Trésor

Des déclarations suivantes, lesquelles peuvent t'aider à répondre à la question :

Comment présenter un projet de la conservation de la nature néo-zélandais au public français ?

Du coup, ta tâche est de trier des déclarations ; lesquelles sont du 'déchet', lesquelles sont du 'trésor' ?

<ul style="list-style-type: none">• Humans instinctively prefer savanna because it is the landscape on which we evolved. In general, humans create savanna through deforestation wherever they go <p>L'être humain possède l'instinct de favoriser la savane car c'est le paysage à partir duquel il a évolué. En général, l'homo sapiens crée la savane partout où il va à cause du déboisement</p>
<ul style="list-style-type: none">• The artists' view of New Zealand coastal and lowland landscapes is that they are deforested, bland, sterile and surreal <p>La vue de quelques artistes des paysages à faibles altitudes et littoraux en Nouvelle-Zélande est qu'ils sont déboisés, insipides, stériles et surréels</p>
<ul style="list-style-type: none">• The French are most likely to associate "the environment" with the state of the environment that their children will inherit. <p>Les français probablement associent « l'environnement » avec l'état de l'environnement que leurs enfants hériteront</p>
<ul style="list-style-type: none">• French people are more likely than the average European to claim that environmental problems do not make any difference in their lives. <p>Les français ont plus de chance que la moyenne des européens de dire que les problèmes environnementaux ne font aucune différence à leur vie.</p>
<ul style="list-style-type: none">• French respondents, like most Europeans, express the greatest concern about climate change. <p>Les français interrogés, comme la plupart des européens, disent que leur plus grand souci en ce qui concerne l'environnement est le changement climatique</p>
<ul style="list-style-type: none">• Nearly 4 in 5 French respondents say that they are ready to buy environmentally friendly products even if they are a bit more expensive. <p>Presque 4 français sur 5 interrogés disent qu'ils sont prêts à acheter des produits écologiques même s'ils sont un peu plus chers</p>

<ul style="list-style-type: none"> • Overall, French respondents seem to be more active in taking action for environmental reasons than the average European. <p>En général, les français interrogés semblent agir en ce qui concerne l'environnement plus que la moyenne des européens</p>
<ul style="list-style-type: none"> • French respondents position economic factors and the state of the environment on a par as regards having an influence quality of life <p>Les français interrogés voient l'économie et l'environnement comme comparable en ce qui concerne leurs influences sur la qualité de la vie</p>
<ul style="list-style-type: none"> • Above all, the French trust scientists as a source of environmental information -52%. <p>Surtout, les français font confiance aux scientifiques comme source de renseignement sur l'environnement -52%, 1 sur 2</p>
<ul style="list-style-type: none"> • 'Most important environmental issue facing New Zealand is water pollution. <p>Les Néo-Zélandais interrogés disent que leur plus grand souci en ce qui concerne l'environnement est la pollution aquatique.</p>
<ul style="list-style-type: none"> • Main sources of damage to air is from motor vehicles and transport <p>Les Néo-Zélandais interrogés disent que l'origine principale de la pollution atmosphérique est les véhicules motorisés et le transport</p>
<ul style="list-style-type: none"> • Scientists, government departments and lobby groups are the sources most highly rated for reliability. <p>La majorité des néo-zélandais interrogés disent que les scientifiques sont les sources de renseignement les plus fiables</p>
<ul style="list-style-type: none"> • John Key denies the scientific data that shows 90% of New Zealand lowland waterways are polluted. <p>John Key nie les données scientifiques qui démontent que 90% des plans d'eau à faible altitude en Nouvelle-Zélande sont pollués.</p>
<ul style="list-style-type: none"> • A survey of levels of deforestation in forested countries throughout the world finds that Indo-Burma is the worst with Zealand as the second worst. In fact, New Zealand has lost 95% of its native forests, and those that remain are threatened by pests such as possum, stoat, ferret, cat and goat and so on. <p>Une étude des taux de déboisement des pays boisés du monde, a trouvé que le pays le pire est l'Indo Burma et la Nouvelle-Zélande est avant-dernière. En fait, la Nouvelle-Zélande a perdu 95% de ses forêts indigènes, et celles qui restent sont en danger à cause des espèces nuisibles telles que : le possum, l'hermine, le furet, le chat, la chèvre...</p>

- The advertising campaign "100% Pure New Zealand" is misleading. The ad implies that the state of the New Zealand environment is excellent; whereas in fact, there are serious problems of water pollution, deforestation and a decline in biodiversity

La campagne publicitaire « 100% Pure New Zealand » est mensongère : elle prétend que l'état de l'environnement en Nouvelle-Zélande est excellent ; alors qu'en réalité, il y a des problèmes graves des pollutions des eaux, de déboisement et un déclin de la biodiversité

"...Forests give us vital benefits. They already play an enormous economic role in the development of many countries as a source of timber, food, shelter and recreation, and have an even greater potential that needs to be realized in terms of water provision, erosion prevention and carbon sequestration." Olivier Langrand, CI's international policy chief.

-

- Will salvation come from the trees? That's what Euan Mason of the University of Canterbury believes. He claims that instead of leaving huge areas of unproductive pasture land to the thistles, by planting 50 000 hectares of trees each year we would capture 15 million tons of carbon dioxide each year.

'Le salut viendra-t-il des arbres ? C'est ce que croit Euan Mason, un universitaire de l'Université du Canterbury, qui avance qu'au lieu de laisser ces immenses étendues de pâturages non productifs aux chardons, en en plantant 50 000 hectares d'arbres chaque année, on emprisonnerai 15 millions de tonnes de gaz carbonique par an.'

Sebastien – Frogs in NZ (2009)

Pour en savoir plus

L'environnement

Cullen, R, Hughey, K., Kerr, G. (2006) 'Public perceptions of New Zealand's environment'. Paper Presented at the New Zealand Agricultural and Resource Economics Society Conference 25-27 August 2006

Eurobarometer. Attitudes of European citizens towards the environment- Results for France - Fieldwork: 10th November - 10th December 2007 - Publication: March 2008. Retrieved from: http://ec.europa.eu/public_opinion/archives/ebs/ebs_295_sheet_fr.pdf, 30/4/2011

Michel, S. (2009) La Nouvelle-Zélande 100% Pure ? Frogs in NZ.com: Article – Comprendre la Nouvelle Zelande. <http://www.frogs-in-nz.com/Comprendre-la-NZ/Actu-en-direct-de-NZ/La-Nouvelle-Zelande-100-Pure>. Retrieved 26/5/2011

Hypothèse de la savane

Dutton, D (2010) *The Art Instinct*.

Hansen, M. and Sinclair, M. (2006) *NCEA Level 3 Biology*. ESA Publications NZ pp. 398-401

Wilson, E.O (1986) *Biophilia*. Harvard pp. 109-114

Réponses

Partie 3 : Comment la Nouvelle-Zélande se vend en Europe

- a) Complète le titre de la pub : *Bienvenue en Nouvelle-Zélande, le dernier Nouveau Monde*
- b) Quelles prétentions sont faites par la phrase: *le dernier nouveau monde? Dernier nouveau monde – la nouvelle frontière de l’âge de la colonisation du 18^e siècle - promesse de l’opportunité et de la liberté*
- c) Quel est le **slogan publicitaire** ? « 100% Pure New Zealand »
- d) Quelles prétentions sont faites par le slogan ? La pub prétend/soutient que l’environnement n’est pas pollué ; c’est un pays juste, innocent, authentique ; c’est un pays culturellement distinct – pas entaché par les dégâts des autres pays du nouveau monde tels que la corruption, perte d’idéalisme cf. Les États Unis
- e) Quel est le titre de la chanson de la pub ? ‘Forever young’
- f) Quelles prétentions sont faites par le titre de la chanson ? Jeunesse éternelle – c’est une prétention à l’innocence ; c’est –à-dire, que le pays restera toujours jeune et fidèle à ses principes /idéaux
- g) En gros la pub prétend que la Nouvelle-Zélande est : un pays d’opportunité/fidèle à ses idéaux/pas polluée
- h) Est-ce que tu es d’accord avec cette image de la Nouvelle-Zélande envoyée au monde. Explique ta réponse.

Lesson 4 Student handout

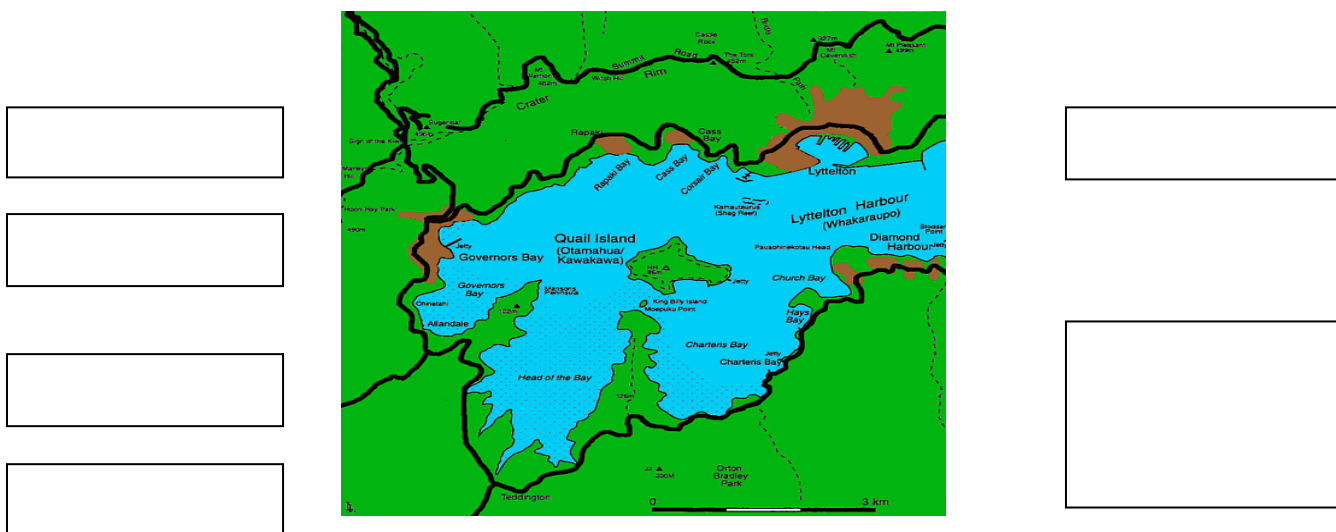
Leçon 4

- Gaia : la biosphère se comporte comme un être vivant - homéostatique – tout est interconnecté
- La stabilité est créée par les interactions parmi les milliards d'espèces
- Perte d'espèces = perte de stabilité
- Réchauffement climatique = Gaia est malade – elle a de la fièvre
- Elle cherche à éliminer une infection : nous !?
- Solution : restaurer et protéger la biodiversité

Leçon 3 : Les points essentiels

- Les français associent « l'environnement » avec l'état de l'environnement dont leurs enfants hériteront.
- Le plus grand souci environnemental pour les français est le changement climatique.
- Déboisement : exacerbe le réchauffement climatique
- la Nouvelle-Zélande a perdu 95% de ses forêts indigènes ; en Nouvelle-Zélande, 90% des plans d'eau à faible altitude sont pollués
- La campagne publicitaire « 100% Pure New Zealand » est mensongère
- Solution : reforestation pour piéger des gaz à effet de serre

Leçon 4



Complète la carte avec les noms en français

Histoire bref de la flore est faune de La Péninsule de Banks et L'île aux Cailles

Échange d'information : Instructions

- Tu recevras un texte court. Lis ton texte et essaie de le comprendre. Tu vas aussi recevoir des textes incomplets. Trouve une camarade de classe qui peut t'aider à le compléter
- Assieds –toi dos à dos avec cette camarade de classe.
- Complète ta fiche de renseignement sur La Péninsule de Banks et L'île aux Cailles en posant les questions en français

1A La flore pré-humaine

- La Péninsule Banks et L'île aux Cailles étaient presque complètement _____ avant l'arrivée des Polynésiens, il y a _____ ans
- L'île se situe au _____ de la Péninsule et elle est sèche – aucune source _____
- **La forêt originale était :**

- Assez ouverte – pas dense
- Composée d'espèces d'arbres qui :
- résistaient à la _____
- _____ le sel marin
- La forêt la plus dense se trouvait où l'humidité _____ :
- sur les côtes qui font face au _____
- et dans les _____

2a) Péninsule Banks en 1860 - recouverte à 75% de forêt

- Les _____, les crêtes des collines _____ brulées par les Maoris pour leur leurs habitations, pour mieux marcher et pour des raisons _____ : la forêt peut cacher leurs ennemis _____ il vaut _____ l'éliminer
- Les feux Polynésienues ont créé une sorte de _____ et de prairie
- 25% de la forêt originale a _____
- _____-Ouest, une région relativement sèche - la savane et la prairie _____
- _____ de 20 _____ d'oiseaux : par exemple, l'aigle géant de Haast et plusieurs espèces de moa

3a) Péninsule de Banks : 1860-1900

- Forêt en déclin de _____% _____ 5%
- Déboisement _____ la _____ pour bois de construction
- Déboisement _____ aux feux de forêts _____ établir des _____
- Au total, _____% des espèces d'oiseaux de la Péninsule _____ disparu

1A La flore pré-humaine

- La Péninsule Banks et L'île aux Cailles étaient presque complètement boisées avant l'arrivée des Polynésienus, il y a 700 ans

- L'île se situe au Nord-Ouest de la Péninsule et elle est sèche – aucune source d'eau fraîche
- **La forêt originale était :**
- Assez ouverte – pas dense
- Composée d'espèces d'arbres qui :
- résistaient à la sécheresse
- toléraient le sel marin
- La forêt la plus dense se trouvait où l'humidité s'accumule :
- sur les côtes qui font face au Sud
- et dans les dépressions

+++++

2a) Péninsule Banks en 1860 - recouverte à 75% de forêt

- Les côtes, les crêtes des collines ont été brulées par les Maoris pour leur leurs habitations, pour mieux marcher et pour des raisons stratégiques : la forêt peut cacher leurs ennemis alors il vaut mieux l'éliminer
- Les feux Polynésiennes ont créé une sorte de savane et de prairie
- 25% de la forêt originale a été perdue
- Nord-Ouest, une région relativement sèche - la savane et la prairie persistent
- Perte de 20 espèces d'oiseaux : par exemple, l'aigle géant de Haast et plusieurs espèces de moa

+++++

3a) Péninsule de Banks : 1860-1900

- Forêt en déclin de 75% à 5%
- Déboisement à la scie pour bois de construction
- Déboisement suite aux feux de forêts pour établir des pâturages
- Au total, 50% des espèces d'oiseaux de la Péninsule ont disparu

Lesson5 Student handout

Leçon 5

Présentation de Yvette Couch-Lewis

Questions

- 1) Le dicton ci-dessous exprime une sorte d'hypothèse et de conséquence. Est-ce ce dicton contient : a) une certitude b) une **incertitude** ou c) une vérité générale ; regarde le tableau ci-dessous.
- 2) Complète la traduction de ce dicton Maori en ajoutant les mots manquants et en conjuguant les verbes.

Hypothèse	Conséquence
Quand il y a une certitude	
<i>L'année prochaine, quand j'irai à l'université,</i> <i>Quand + futur simple,</i>	<i>j'étudierai le français.</i> <i>futur simple</i>
Quand il n'y a pas de certitude	
<i>Le mois prochain, s'il y a un autre séisme à Christchurch,</i> <i>si + présent,</i>	<i>je quitterai la ville.</i> <i>futur simple</i>
Quand la phrase exprime une vérité générale	
<i>Si les écosystèmes sur Terre s'effondrent,</i> <i>si + présent,</i>	<i>l'être humain disparaît.</i> <i>présent.</i>

Toitū te marae o Tāne

Toitū te marae o Tangaroa

Toitū te iwi

If the marae of Tāne (deity of the forest) survives

If the marae of Tangaroa (deity of the sea) survives

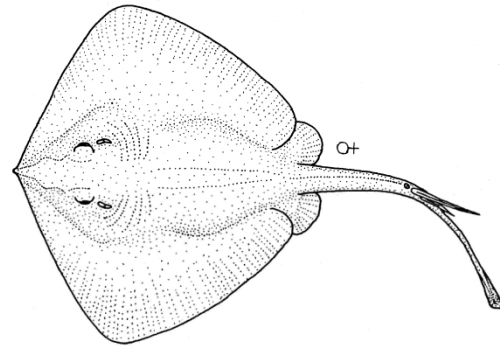
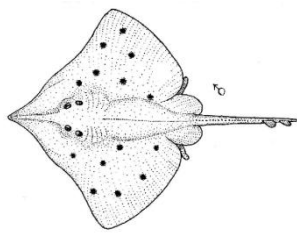
The people live on

_____ *le lieu de rencontre de Tāne (la divinité de la forêt)* _____ *(survivre)*

_____ *le lieu de rencontre de Tangaroa (la divinité de la mer)* _____
(survivre)

Le peuple _____ *(perdurer = to endure)*

- 3) Le sens superficiel de 'Whakapapa' est *généalogie* ou *hérité* ; mais il y a également un sens écologique, explique-le.
- 4) Compare les préoccupations écologiques principales chez les français à celles des Maoris.
- 5) Comment les Maoris de L'île du Sud se nourrissaient ?
 - a) Ils pratiquaient l'agriculture
 - b) Ils étaient les chasseurs-cueilleurs
- 6) Explique la relation entre la coutume de l'hospitalité (*manaakianga*) et la qualité de l'environnement dans lequel la tribu va chasser et ramasser des aliments (*mahingakai*) ?
- 7) Il y a deux noms maoris pour l'île aux Cailles ; explique le sens de chacun.
- 8) Qu'est-ce que l'*harakeke* et à quoi sert-il ?
- 9) Pourquoi, les falaises de L'île aux Cailles sont-elles noires ?
- 10) Explique la raison pour laquelle les raies (*whairepo*) au Port de Lyttelton sont protégées.



Whairepo (Raie)

a) *Dipturus* ('Smooth skate')

b) *Dasyatidés* ('Short tailed stingray')

Du point de vue évolutionnaire les raies sont très proches des requins. Le 'Smooth skate' (*Dipturus innominatus*) peut mesurer plus de 2,4 m de long et peser plus de 75 kg. Le 'Short tailed ray' (*Dasyatis brevicaudata*) peut atteindre une longueur de 4,3 m et peut peser jusqu'à 350 kg.

11) Décris la vision du monde Maori.

Maori- French – English vocabulary

Maori	French	English
Aotearoa	La Nouvelle-Zélande (<i>la terre du long nuage blanc</i>)	New Zealand (land of the long white cloud)
Aua	'Je ne sais pas' (King Billy Island) – source de grès (<i>hoanga</i> – grès à gros grains)	' I don't know ' (King Billy Island) – Source of coarse grained sandstone (<i>hoanga</i>)
Hapu	Sous-tribu (nf)	Sub-tribe
Haraheke	Lin, fibre végétale L'huile de lin	Flax, plant fibre Linseed oil = flaxseed oil
Hoanga	Grès (nm) - sert à aiguiser le jade (<i>pounamu</i>) et d'autres pierres. Meule(nf)/Meuler	Sandstone – used to sharpen greenstone (<i>pounamu</i>) and other stone. Grindstone/To grind
Horomaka	Le Peninsule de Banks	Banks Peninsula
Hua	Œuf d'oiseau de mer (nm)	Seabird's egg
Iwi	Tribu (nm)	Tribe
Kai	Nourriture (nf)	Food
Kai moana	Les fruits de mer	Sea food
Kainga	Village (nm)	Village
Kai o Ruru	Baie de l'Eglise – L'endroit où il y a beaucoup de chouettes (Ninox boubouks)	Church Bay – Place where there are a lot of owls (<i>moreporks</i>)
Kaitiakitanga	Système (nm) de prise de décision en	'Kaitiakitanga is an

	ce qui concerne l'environnement	environmental decision making system
Kaitangata	Anthropophagie (nf) – l'acte de manger ceux qui ont été tués durant la bataille Le nom Maori pour La Péninsule de Manson Dans le roman pour enfants de Margaret Mahy 'Kaitangata Twitch', L'île aux Cailles est rebaptisée 'Kaitangata Island'	Cannibalism - the eating of those defeated in battle The Maori name for Manson's Peninsula In the children's novel 'Kaitangata Twitch' by Margaret Mahy, Quail Island is renamed as 'Kaitangata Island'
Kawakawa	Arbre à poivre - <i>Macropiper excelsum</i> - plante médicinale	The pepper tree - <i>Macropiper excelsum</i> – a medicinal plant
Koreke	Caille (nf)	Quail
Korora	Le Manchot à ailerons blancs : une sous-espèce du petit manchot bleu	White flippered penguin sub-species of the Little blue penguin
Kumara	Patate douce (nf) – il y a un microclimat sur Otamahua – plus chaud que Christchurch.	Sweet potato – there is a microclimate on Quail Island – warmer than Christchurch
Kupenga	Filet de pêche (nm) fait à base de lin (<i>flax</i>)	Fishing net made from flax
Mana	Prestige (nm), fierté (nf)	Prestige, pride
Maoritanga	Culture maorie (nf)	Maori culture
Marae	Espace (nm) communautaire de la tribu ; lieu de rencontre	Communal area of a tribe ; meeting place
Mana whenua	Droit (nm) coutumier sur de la terre – souveraineté sur une région – <i>Ngai Tahu a mana whenua</i> sur Otamahua	Customary rights over the land – sovereignty. <i>Ngai Tahu</i> has <i>mana whenua</i> over Otamahua
manaakianga	L'hospitalité envers les invités	Hospitality towards guests
Mahinga kai	Site (nm) où la nourriture traditionnelle est cueillie – Otamahua est <i>mahinga kai</i>	Site where traditional food is gathered – Otamahua is a site of <i>mahinga kai</i>
Mako	Requin (nm)	Shark
Mauri	L'essence (nf) qui unit les éléments d'ordre physique et spirituel de toutes choses. <i>Mauri</i> crée et maintient toutes formes de vie.	'...the essence that binds the physical and spiritual elements of all things together, generating and upholding all life.'
Ngati, Ngai	Tribu (nf). Par ex. <i>Ngati Toa</i>	Tribe, e.g. <i>Ngati Toa</i>
Otamahua	L'île (nf) aux Cailles - le site où les enfants cueillent les œufs d'oiseaux de mer	Quail Island – the place where children gather seabird eggs
Pakeha	Différent/e, étranger /ère . Nom donné aux Néo-Zélandais d'origine européenne	Different, stranger. Name given to New Zealanders of European origin

Paua	Ormeau (nm), abalone (<i>haliotis</i>)	Paua
Pounamu (greenstone)	Néphrite (nf), jade (nm)	Greenstone, jade
Rohe	Région (nf)	Region
Rununga	Village (nm)	Village
Tama	Les enfants	Children
Tangata Whenua	Le premier peuple (nm), les Maoris – le peuple de la terre	The first people, the people of the land
Taonga	Trésor (nm)	Treasure
Te Kawakawa	Nom alternatif de l'île aux Cailles	Alternative name for Quail Island
Te Waipounamu	L'île de Sud	The South Island
Taniwha	Être spirituel en forme de serpent de mer – le <i>taniwha</i> (nm) donne chance et malheur – il y a un <i>taniwha</i> sur Otamahua.	Spiritual being in the form of a sea serpent. The <i>taniwha</i> brings good or bad luck. There is a <i>taniwha</i> on Quail Island.
Tapu	Sacré (nm), tabou (nm)	Sacred, taboo
Te reo Maori	La langue maorie	Maori language
tohunga	Prêtre, expert	Priest, expert
Tūpoupou	Le dauphin d'Hector	Hector's dolphin
Umu	Four (nm) dans la terre	Earth oven
Waka	Canoë (nm)	Canoe
Wai	Eau (nf)	Water
Waihora	Lac d'Ellesmere	Lake Ellesmere
Whakairo	Art (nm) de la sculpture	Sculpture
Whai	Raie (poisson)	Stingray
Whakapapa	Généalogie, hérité (de tout)	Genealogy, heritage (of all things)
Whanau	Groupe (nm) familial étendu	Extended family
Whare	Maison (nf) – L'île aux Cailles n'a jamais été occupée sauf lors des excursions pour cueillir de la nourriture. Un petit <i>whare</i> a été établi pour cette raison sur la côte en face de Rapaki.	House – Quail Island was never inhabited except for overnight food gathering excursions. A little <i>whare</i> was established for this reason opposite Rapaki
Wahi tapu	Site (nm) sacré	Sacred site

Bibliography

Bunn, T and Roberts, A. (2008) *NCEA Level 2 Biology*. ESA Productions, Auckland. 432 p.

Environment Canterbury (2005) Regional Coastal Environment Plan for the Canterbury Region. Volume 1, Report No. R04/13/1. November 2005.

<http://www.crc.govt.nz/publications/Plans/RegionalCoastalEnvPlanNovember05.pdf> Retrieved 11/6/2011

Grégoire, M. et Thiévenaz, O. (1995) *Grammaire Progressive du Français – Niveau intermédiaire*. CLE Internationale, Paris. 256 p.

Hart, D., Marsden, I & Francis, M. (2008) Coastal Ecosystems in Winterbourne, M *et al*, *The Natural History of Canterbury, Third Edition*. Canterbury University Press, Christchurch, 924 p.
<http://www.geog.canterbury.ac.nz/departement/staff/deirdre/Hart%20et%20al%20Nat%20Histy%20chap%20Coastal%20Systems.pdf> Retrieved 16/6/2011

Jackson, P (2008) *Otamahua/Quail Island a Link with the Past*. Otamahua/Quail Island Ecological Restoration Trust

Malherbe, M. (2007) *Parlons Maori*. L'Harmattan. Paris 190 p.

Ministry of Fisheries (2003) Rapaki Mataitai Reserve
<http://www.fish.govt.nz/NR/rdonlyres/3FC9E0FD-AA19-47C5-BBB3-686B0E8C88DF/0/rapaki.pdf>
Retrieved 16/6/2011

Wilson, H (2010) *The Natural History of Banks Peninsula*

Websites

Maori Dictionary Online : <http://www.maoridictionary.co.nz/>

Réponses

- 1) **c) une vérité générale**
- 2)

Si le lieu de rencontre de Tāne (la divinité de la forêt) survit

Si le lieu de rencontre de Tangaroa (la divinité de la mer) survit

Le peuple perdure

- 3) Le sens superficiel de 'Whakapapa' est *généalogie* ou *hérité* ; mais il y a également un sens écologique, explique-le.

Le Whakapapa lie tout qui est physique et spirituel et à leurs origines ; il montre que tous les êtres vivants et non vivants sortent de la même source et sont interconnectés, comme c'est le cas pour les éléments dans la biosphère.

- 4) Compare les préoccupations écologiques principales chez les français à celles des Maoris.

Pour les Maoris : la santé des ressources naturelles comme la flore et la faune déterminaient le bien-être et le futur de la tribu. Donc, la gestion et l'entretien des ressources naturelles étaient une préoccupation majeure.

Pour les Français: la préoccupation écologique principale est le changement climatique. De plus, les français associent « l'environnement » avec l'état de l'environnement dont leurs enfants hériteront.

- 5) Comment les Maoris de L'île du Sud se nourrissaient ?
b) Ils étaient les chasseurs-cueilleurs

- 6) Explique la relation entre la coutume de l'hospitalité (manaakianga) et la qualité de l'environnement dans lequel la tribu va chasser et ramasser des aliments (mahingakai) ?

Nga Tahu a un grand sens de l'hospitalité ; être en mesure de chasser et cueillir pour préparer les plats traditionnels pour les invités reste une source de prestige et de fierté (mana) pour la sous-tribu (hapu).

- 7) Il y a deux noms maoris pour l'île aux Cailles ; explique le sens de chacun.

Te Kawakawa : Kawakawa ou l'arbre à poivre (*Macropiper excelsum*) a des propriétés médicinales. Te kawakawa est le nom plus ancien pour l'île aux Cailles ; on présume donc d'après ce nom que l'arbre à poivre devait pousser sur l'île.

Otamahua : C'est le nom Maori actuel de l'île : Tama = enfants, Hua = œuf d'oiseaux de mer ; donc, Otamahua « le site où les enfants ramassent des œufs d'oiseaux de mer »

- 8) Qu'est-ce que l'*harakeke* et à quoi sert-il ?

Harakeke est le nom Maori pour le lin. Le lin est utilisé pour fabriquer des cordes et des paniers.

Sur les falaises au nord de l'île aux Cailles, les garçons de Rapaki ramassaient des œufs d'oiseaux de mer. Le moyen était le suivant : en se

mettant individuellement dans un panier en lin attaché par une corde également en lin, l'enfant était descendu du haut de la falaise pour ramasser les œufs. C'était un jeu très dangereux, avec non-seulement les coups du vent mais les attaques d'oiseaux. Ce jeu servait à tester le courage et la virilité des garçons.

Le lin servait encore à faire des filets de pêche (kupenga) pour attraper des requins. Les filets faisaient 400 m (quatre cents mètres) de longueur et 8 m de profondeur.

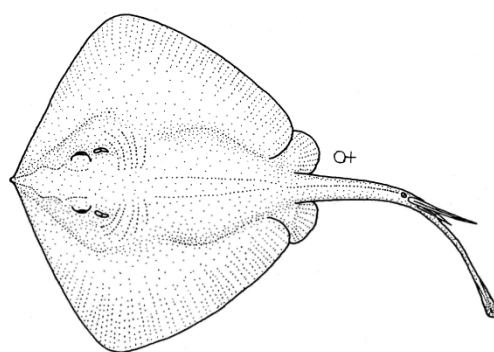
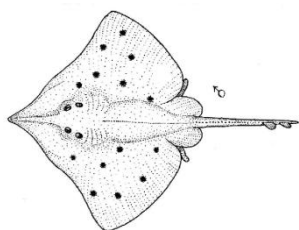
9) Pourquoi, les falaises de L'île aux Cailles sont-elles noires ?

Lorsque le célèbre explorateur Tamatea Pokai Whenua est arrivé au lac Waihora (lac Ellesmere) il faisait très froid. Tamatea a récité une incantation (karakia) afin de faire venir des feux (ou éruptions volcaniques) de l'île du nord. Les feux sont venus et coulaient des pentes des montagnes de la Péninsule de Banks (Horomaka) brûlant les falaises du nord de l'île aux Cailles.

On peut déduire de cette légende de Tamatea que la Péninsule de Banks était touchée par des éruptions volcaniques et que l'île a été brûlée – pour les Maoris, ceci représente le lien entre l'île du Nord et l'île du Sud.

10) Explique la raison pour laquelle les raies (whairepo) au Port de Lyttelton sont protégées.

Du point de vue évolutionnaire les raies sont très proches des requins.



Whairepo (Raie)

c) *Dipturus* ('Smooth skate'
stingray')

b) *Dasyatidés* ('Short tailed

Le 'Smooth skate' (*Dipturus innominatus*) peut mesurer plus de 2,4 m de long et peser plus de 75 kg.

Le 'Short tailed ray' (*Dasyatis brevicaudata*) peut atteindre une longueur de 4,3 m et peut peser jusqu'à 350 kg.

Les raies sont protégées au Port de Lyttelton parce qu'elles sont considérées comme des 'taniwha'. Les taniwhas sont des êtres spirituels qui protègent l'hapu (sous-tribu). [Il est intéressant de noter que l'île aux Cailles a une forme qui rappelle celle de la raie.]

11) Décris la vision du monde Maori.

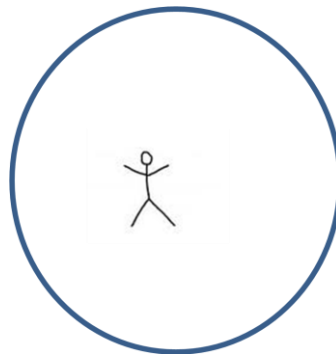
La vision du monde Maori est pré-moderne ; c'est-à-dire que les êtres humains sont complètement intégrés aux mondes physique et spirituel.

Lesson 6 Student handout

Leçon 6 : Résumé

Vision du Monde Pré- Moderne

Dans la période pré-moderne en Europe (avant le 17^e siècle) l'Homme se voit comme faisant *partie intégrante* de la nature, de la société et de l'esprit de Dieu.



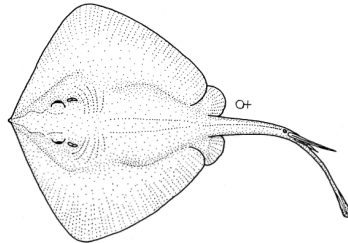
- Authenticité : l'unité avec la société, la nature et Dieu
- Whakapapa : les êtres humains sont complètement intégrés aux mondes physique et spirituel.
- L'amour courtois : exprime l'unité entre le physique et le spirituel
- La nourriture naturelle, la cuisine traditionnelle
- Mahinga kai
- Kaitiakitanga (environmental stewardship, *intendance environnementale*)
- Dicton Maori :

Si le lieu de rencontre de Tāne survit

Si le lieu de rencontre de Tangaroa survit

Le peuple perdure

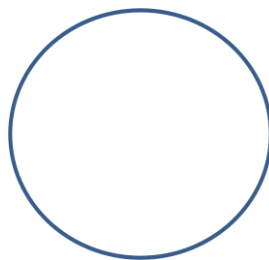
- Un taniwha en forme de raie protège la sous-tribu (l'hapu)



Lesson 6

Vision du Monde Moderne

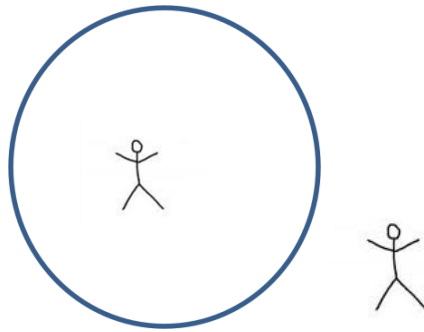
Après le moyen âge, l'Homme commence à se sentir 'écarté' de la nature : il est devenu *observateur* et *manipulateur*.



- L'individualisme – la vie semble 'inauthentique'
- La crise environnementale
- Les OGMS, la malbouffe,
- Mac Do... :
- Inauthenticité
- Le déboisement
- Le réchauffement climatique
- La perte d'identité

Vision du Monde Postmoderne Écologique

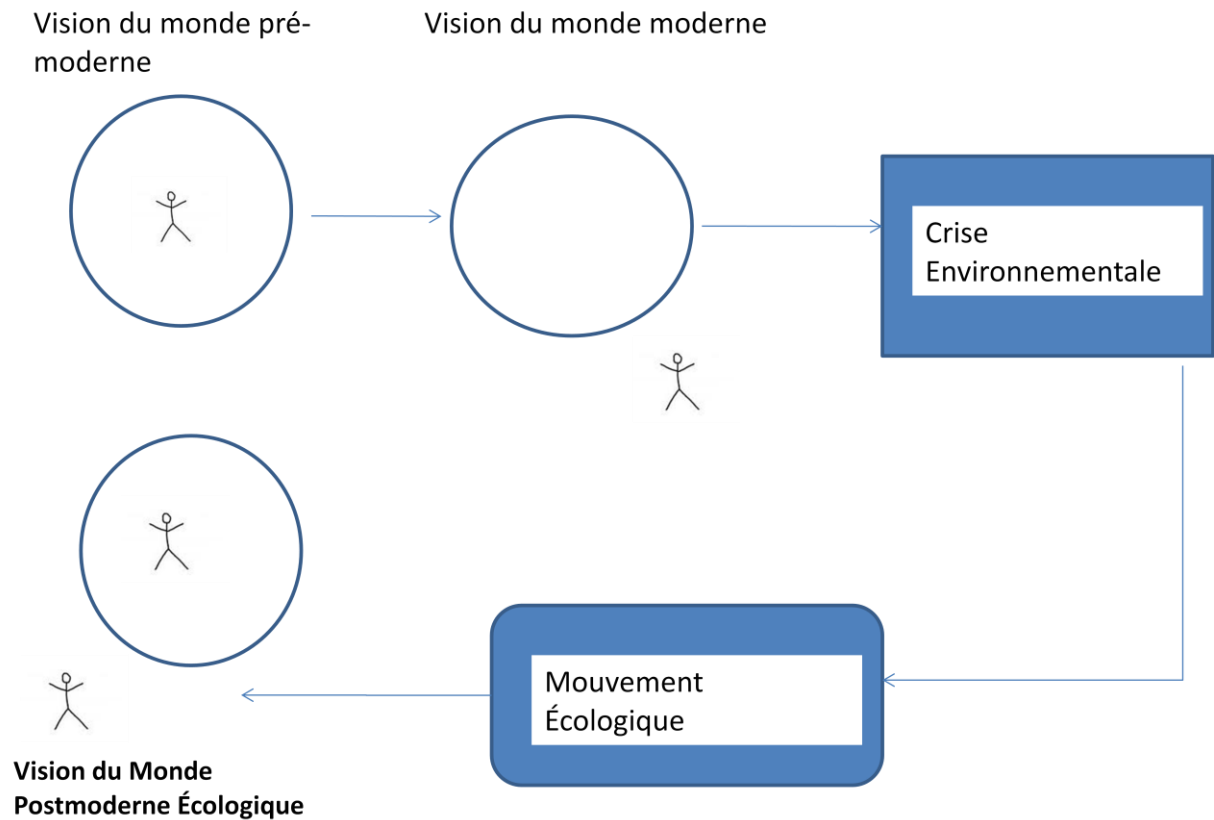
L'homme désire vivre *en harmonie* avec la nature tout en restant observateur et manipulateur de la nature.



- Le développement durable
- Le mouvement écologique
- Chanson sur José Bové:

*« José Bové près de Millau,
eut la courante dans un Mac Do.
Les cornichons sont pas passés,
il est revenu le démonter »*

- La reforestation
- La restauration écologique de L'île aux Cailles



Pourquoi pratiquer la conservation de la Nature ?

Gaia

- Gaia : la biosphère se comporte comme un être vivant - homéostatique – tout est interconnecté
- La stabilité /L'homéostasie est créée par les interactions parmi les milliards d'espèces
- Perte d'espèces = perte de stabilité
- Réchauffement climatique = Gaia est malade – elle a de la fièvre
- Elle cherche à éliminer une infection : nous !?
- Voir *Kaitangata Twitch* : où l'île mange ceux qui détruisent la nature



APPENDIX 2: SELECTED OBSERVATIONAL NOTES & TEACHER-RESEARCHER DEBRIEF NOTES

Lesson 1.

Teacher nervous about teaching a course that is not hers. *Leçon 1* about courtly love difficult for her to get. I explained the principal arguments: courtly love an expression of medieval world view - study nature = study of the mind of God - no distinction between self and society and nature and God. People accepted their fate as an expression of God in control - this includes disease, misfortune etc

The enlightenment was a revolution in thought: the individual is outside nature as observer and manipulator not willing to accept fate or acts of God.

This has caused the environmental crisis - we manipulate for better or worse.

Teacher gave introduction

Presented me and I said a few words to kick off the unit.

Teacher summarised this statement in French for the students [will need reinforcing]- but she gave a good explanation.

7 students and Fr assistant.

Assistant + Group 2: L2, L1, L3

2 Dictaphones on table Teacher at the head standing

Group 1: L7, L6, L5, L3

Students may have read article during the holidays - many forgotten

Teacher did brain storming about what is courtly love

very good answer given by L3

The pre-reading task was done in part by Teacher - not successful - image quality of *Mon seul désir* bad due to too much light - missed opportunity to examine a very beautiful tapestry. The Siege of the castle of love - not the same as the students had.

Main point of courtly love missed in the pictures - especially the power of gentleness in *Mon Seul Désir*.

L7 seemed lost.

Teacher's questioning awkward and showed she wasn't completely in control

Gave an English definition of courtly love with its characteristics - gave a lecture

10:00

most students seem stuck

Group 1 - most competent - worked on Darwinian interpretation

Group 2 - quiet and disinterested - yawn

worked on the history of courtly love

[not as interesting a subject as Grp 1]

trying to avoid emotional response to students or nods of approval lest it influence their performance.

robust discussion in Grp 1 on courtly love - talked about movie stars Zeta Jones and Michael Douglas - folk biology psychology.

Teacher let the Expert group discussions go on too long and not enough time for discussion - Group 2 did a poor job at summarising their text - brief and uninteresting.

Students have the task of writing blog entry on Courtly love.

Will see how they do.

Post-lesson Teacher – Researcher Debrief

T: Is that...?

53:31 R: It's really hard to know how much time should be given to discussion.

T: Hmm

R: ..but I wasn't really listening to them ...I'll check on the tape what they were saying...I was more focusing on this group as I thought they had more interesting ...I would have hoped that they would have brought out this idea of the cult of Mary

T: yeah

R: as the Lady is this spiritual guide

T:Right

R:...that'll come out...what I'm going to do is I'll post the article in the blog so that they have them with the instructions ...it came out and they were animated...

T: Oh yeah

R: Interested, ..it didn't get to the point where they were arguing in french

T: They won't

R: they won't?

T:They don't.[background noise -heavy machinery]...in French

R: They should, because it's good...I think it's great ...their level of French is probably as good as the level that my students had in France.

T: Yeah but your students were older

R: were older...that's true

T: and they were French and used to debating

R: No in France it's not like that. In these classes they 're terrified of giving an opinion in case someone might think they are wrong

T: Oh really?

R: We'd spend a year breaking that down.

T:OK

r: That...it's a real cultural thing...Next week is the song.

T: Yeah

R:You probably thought..you didn't want to give the song for homework.

T: No

R: it was too much

T: I might be able ...do it

R: Yeah

R: that theme will hopefully come together next week

T: yeah - Yeah that's right

R: I'm working frantically to get this material to you

T: OK Great

R: I'll mix it in with art

T: Cool

R:

....

Lesson 2

1. Introduction - overview of the lesson - question: What is authenticity? Good responses (answers probably better in English)

Students brainstorm authenticity - good pre-learning task

2. PP slides comparing places and activities in terms of authenticity

3. Slide on J.Bové - overview of life

4. Song for JB presidential campaign - fill in gaps

5. Reading - answering Q8 - linking Leçon

world views and authenticity

7. concept diagram of the main points.

Note that the oriL3l intention was to get students to listen to the song at home - some though do not necessarily have access to computers (surprising for School #1 students)

T does not want to give them anymore homework than writing tasks which are to be done in the journal.

1. T began with an introduction of the investigation of the theme of authenticity - relating it to the 1840 datum - they had talked about it in class previously - she seems to have encouraged the girls to write in their journals. Exercises that were to be put on the blog are now going into their journals.

Discussion - what is authenticity?

2. Continued on with PP of authentic/inauthentic images

Initial discussion that petered out - too many slides.

discussion on picture of Auckland and Paris

Student x? said Paris was more authentic because it was older and less generic

-some images led to good discussion most did not - girls said they didn't know

3. Slide of Asterix in Mac Do was lead in to JB.

Last minute slide on his life proved vital.

girls read through bullet points.

4. Students listened to the song. Lyrics very fast. Girls got most though.

[this exercise - does not contain much reflection as it is only making a summary - the real reflection will come about in the journals - I hope.

yawning - during summary

- needs to be stressed that there are no right and wrong answers only opinion - same will be true for the landscape one - need to meet with T before the lesson to make sure these points are emphasised - she may actually discuss material during the week

- added PP slide last minute of an overview of Jose Bové - it was really necessary - students surprised that a presidential candidate could be as radical as he is.

Summary

The teacher gave short introductory lectures in French. There was in lesson 2 build up to the ideas given in the previous lesson. This was done on Teacher's volition. In this lesson the teacher had grasped the concepts notably of the 1840 datum.

Teacher gave an introduction a brief introduction of about 2 minutes in French introducing the class – stating what would be talked about and that there would be a song about Jose Bové and a PowerPoint.

She then got students to give their opinions in French concerning what they thought authenticity was. Students were not forthcoming. One student offered in French a definition as “a new idea”. The teacher after a pause of silence from the class asked the question again in English.

This was much more productive. Students were more animated and forthcoming. Authenticity for these students means original ideas and original work.

In order to combat problems of plagiarism and other forms of cheating in internal assessments, at the beginning of each year students in the senior years of NCEA sign with their parents an statement of authenticity. They promise that all assessments will be original.

Part 2 of the brainstorming is looking at the website that deals with detecting real and fake smiles. The teacher asked students to talk about how one can distinguish them.

Teacher refers students to the website - activity to be done at home –

The teacher during all brainstorming repeated student utterances in French correcting pronunciation.

Lesson 3

L5: "This is a different way of learning..laughter"

Whole lesson conducted in Fr.

Major earthquake work going on outside the classroom making recording intolerable.

T was very well prepared and had a great understanding of the material.

All students included sea, mountains and all houses were located in a city.

In contrast to the drawing from Grenoble which were situated away from the city with the exception of the sketch of Nice.

In response to the notion of the savannah hypothesis students responded ...perhaps

T did not present them.

T later said that because the houses were in the city that the savannah hypothesis was not relevant.

Responses to paintings:

L5 : *pas intéressant - tout le temps –partout-ennuyeux pas toujours* - The Bay

L : *j'aime bien la contrast entre ville et montagnes*

L : *les couleurs*

L5 : they clashed - kinda of 'speedy'

Très joli

Chez toi

Ça me fais penser de

La plage n'est pas sable

Maryrose –imaL3tive

Beau

L'image que NZ - Paysage beau propre foret -mais on voit les collines dénudé

Responses to advertisement

- the last frontier - untouched

- 100% Pure - green no pollution

-Forever Young

Jeune pays ' lots to do, activities, spontaneous, it makes you young

- claims NZ is green pretty pure

Do you agree?

Partial truth

Not like my city

Seen this

This is awkward

How do you say awkward? *Génant*

Il a raison.

Journaliste attaque - harsh

All ads exaggerate

80% c'est.. pas vient en

80% pure come here

It's embarrassing

Students have to present NZ to the French

What would they say -in relation to authenticity?

Truth?

Moral question

NZ is not green

L7's response

L7 presented a different interpretation of the ideal landscape and savannah hypothesis in relation to NZ Landscape painting and the 100% Pure ad campaign.

L5's point was that the boring landscapes of McCahon's painting were ubiquitous making New Zealand landscape boring by inference.

Instead, L7 combined the observation that the ideal landscapes the students included cities whereas the landscape paintings were completely dehumanised

Note well that L7 appeared to believe that ideal landscapes did not contain cities owing to the teacher's comment and belief that the savannah hypothesis did not work.

T may not have understood or followed the joke that the empty landscapes were boring.

Instead L7 understood that ideal landscapes don't contain cities - are dehumanised.

The paintings are ideal landscapes and don't contain cities

The version of the 100% Pure ad show a dehumanised landscape revised version shows Auckland.

In this extract neither L3 nor L7 appear to believe that the landscape was boring.

As only audio recordings were permitted I cannot be sure whether L3 and L7 were laughing.

Post-lesson Teacher - Researcher Debrief

I said to the teacher that I thought the lesson worked well because of the discussion generated. Of note were students asking for a French translation of the word 'awkward' in French to describe their reaction to the interview. The T replied that she did not think the lesson worked at all. She said the savannah hypothesis did not work because the students all drew pictures featuring cities.

Auto-reflection on lessons

My lessons are in constant evolution - they change *en fonction des regards des étudiantes et le niveau de 'boredom' of T.*

Material used - ie epigenetic rules - should be of interest to students if presented in the right way as it is describing themselves. it must be presented dispassionately lest it be backed away from.

I am adjusting my next lesson to the mood in the class - students seem a little lost - but come through in the written exercises.

The attitude of the teacher is at times of 'this is a bit of a bother' but she is coming to see the value in it.

I am responding to feedback from all those involved to write the lesson that fits in with them to achieve the goals of a values shift and improvement in French communication and cultural understanding

Authenticity - is a pivotal notion in cross cultural and cross disciplinary studies - ie what is real for the individual relates to what they consider quality/valuable and this relates to their identity.

Authenticity is a far more encompassing concept - everything and everyone can be seen in terms their genuineness - authenticity is the goal - the lodestar for the system - detecting inauthenticity leads to negative feedback and adjustment of direction - it is part of a cybernetic system.

Authenticity functions from a postmodern and evolutionary psychological point of view as well.

Lesson 4

Students read about the impact of Maori on Banks Peninsula and the loss of species including giant eagle and moa.

Note that students can't believe what they are reading - they are used to the straight forward in French.

The act of translating texts to absorb information - element of decoding of algebraic problem.

Décodage would surely enhance learning as it engages different parts of the brain making links - what is going on? The translator is being taken away from the known to the unknown and back again.

What is the effect of *décortiquer* shelling phrases

déchiffrer

A slow meditative learning

Lesson 5

Whakapapa = web of life including us -people link to each other and the land - explains relationship and descent from the gods – The Maori representative read her talk and probably lost her audience. [The teacher confirmed this in Lesson 6].

Maori cosmology and whakapapa so close to sustainable development -major connector to curriculum learning areas. Maori Whakapapa a major consilient mechanism - powerful tool.

Lesson 6

Pivotal lesson -here the researcher explains the links between the lesson and the theme for the podcast.

Students and Teacher ask questions and students discuss in amongst themselves.

Most initially confused about the role of Courtly love. They see it now as just an expression of the pre-modern mindset where everything had spiritual significance just as it did in Maori culture - link with the taniwha of Quail island.

Moment of revelation and aghast when T discovered that the motivational force for conservation is largely aesthetic and *jardinage*. General public at times feels miffed by the moralising.

Students understood the pre-modern , modern, and postmodern world views in relation to courtly love, Maori cosmology, and environmental movement.

Students readily able to grasp the deeper concepts.

L7 in philosophy course. Note interest she takes in L4's involvement.

Even though students could grasp these concepts it was time consuming.

I did not receive the learning journals and do not know if they felt their learning improved.

T did not say. Enabler: Maori input -especially for scholarship -Connect the contents to their lives and to other subjects.

Lesson 7

L7: This is going on the website

L3: Maybe we shouldn't be so mean about our country

T: You're being realistic aren't you?

L3: Yes

T: well that's alright

Lesson 9

'Spoke to the teacher about the idea that Quail Island was possibly an expression of courtly love. she doesn't agree - skill development is according to the teacher about feeling better about one's self and has nothing to do with attracting a mate. She thinks the explanation is "crow barring courtly love". The teacher vehement that this is not the case. She does not

accept the evolutionary psychology argument at all. [feel that she is censoring the information or filtering - this is important for the study - what can and can't be believed]

[possibly - the teachers reaction to the C.L./Q.I connection is a kind of sexual censorship.]'

- girls find courtly love does not fit into QI - [the teacher agrees]

Lesson 10

Students have grasped meaning and now putting it into French from their own words -the process was - translate into English - paraphrase in English - rewrite in French in their own words. this is learning through looking at the subject from multiple angles. Filtering it though another language.

Students grasped difficult material and L4 and L1 put it into a song

In lesson 3 T rebelled against the topic but clearly students have made it their own - and have a strong grasp of it.

Students oscillate in and out of the topic – cybernetic learning –constant - reflexive verb debate -forests replaced by farms -nature the study of God

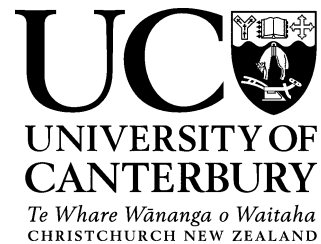
L5 refuses to use the common room – fears it is unsafe due to earthquake damage

APPENDIX 3: ETHICS DOCUMENTS

a) Consent Form for Class Teacher

College of Education

R.M.Genet
University of Canterbury
Dovedale Avenue
Ph. [329 4777]
Email: [ray.genet@pg.canterbury.ac.nz]



Exploring Opportunities for Natural Science and Arts Integration

Case Study Level 8 French at School #1

Consent Form for Class Teacher

(Please tick each box)

- I have been given a full explanation of this project and have been given an opportunity to ask questions.
- I understand that the researcher Ray Genet will observe and record my classes on the agreed dates, and I give him permission to do so.
- I understand that the researcher's thesis supervisors may also observe classes and I also give permission for this.
- I understand what will be required of me if I agree to take part in this project.
- I understand that my participation is voluntary and that I may withdraw at any stage without penalty.
- I understand that any information or opinions I provide will be kept confidential to the researcher and that any published or reported results will not identify me.
- I understand that information provided by students in their questionnaires and learning journals is confidential and I am not at liberty to read them.

- I understand that questionnaires and learning journals cannot be used for assessment purposes.
- I understand that all data collected for this study will be kept in locked secure facilities and will be destroyed after five years.
- I understand that results of the study may be submitted for publication to national or international journals or presented at educational conferences

- I understand that neither my students, nor their school, will be identified in any publication or presentation that draws on this research
- I understand that I will receive a report on the findings of this study. I have provided my email details below for this.
- I understand that if I require further information I can contact the researcher, Ray Genet. If I have any complaints I can contact the Chair of the University of Canterbury Educational Research Human Ethics Committee.

By signing below, I agree to participate in this research project.

Name: _____

Date: _____

Signature: _____

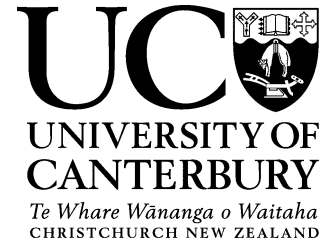
Email address: _____

Please return this completed consent form to Ray Genet in a sealed envelope by Monday 16 May 2011.

b) Consent Form for Parent(s)/Guardian(s)

College of Education

R.M.Genet
University of Canterbury
Dovedale Avenue
Ph. [329 4777]
Email: [ray.genet@pg.canterbury.ac.nz]



Exploring Opportunities for Natural Science and Arts Integration

Case Study Level 8 French at School #1

Consent Form for Parent(s)/Guardian(s)

(Please tick each box)

- I have read the information sheet given to you and understand what will be required of my daughter if she participates in this project.
 - I understand that if she accepts to participate she will fill out a pre- and post unit questionnaire as well as a keep a learning journal, and that these will not be used for assessment.
 - I understand that the group discussions will be audio-taped.
 - I have read the information sheet and understand that all information collected will only be analysed by the researcher and that it will be kept confidential and secure. Your daughter's teacher will not read her journal entries or questionnaires.
 - I understand that results of the study may be submitted for publication to national or international journals or presented at educational conferences.
 - I understand that neither my daughter, nor her school, will be identified in any presentations or publications that draw on this research.
 - I understand that all data collected for this study will be kept in locked and secure facilities and will be destroyed after five years.
 - I understand that her participation is voluntary and she may choose to withdraw at any
- University of Canterbury Private Bag 4800, Christchurch 8140, New Zealand. www.canterbury.ac.nz

time without penalty.

- I understand that as her parent /guardian my consent to allow her to participate is required, and I may withdraw it at any time.

- I understand that I can receive a report on the findings of the study. I have written my email address below for the report to be sent to.

- I understand that I can get more information about this project from the researcher, and that I can contact the University of Canterbury Ethics Committee if I have any complaints about the research.

- I agree to allow my daughter to participate in this research, and my daughter has also given consent on her consent form.

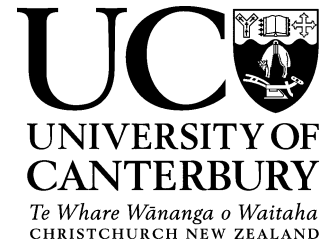
Parent/Guardian full name: _____
Student full name _____
Class _____
Class Teacher _____
Signature _____
Date _____
Email address for report _____

Please return this consent form in a sealed envelope to class teacher, no later than Monday 16 May, 2011.

c) Consent Form for Students

College of Education

R.M.Genet
University of Canterbury
Dovedale Avenue
Ph. [329 4777]
Email: [ray.genet@pg.canterbury.ac.nz]



Exploring Opportunities for Natural Science and Arts Integration

Case Study Level 8 French at School #1

Consent Form for Students

(Please tick each box)

- I have read the information sheet and understand what will be required of me if I participate in this project.
- I understand that if I accept to participate I will fill out a pre- and post unit questionnaire, as well as a keep a learning journal, and that these will not be used for assessment. My teacher will not read my journal entries or questionnaires.
- I understand that the group discussions will be audio-taped.
- I have read the information letter and understand that all information collected will only be analysed by the researcher, and that it will be kept confidential and secure.
- I understand that results of the study may be submitted for publication to national or international journals or presented at educational conferences.
- I understand that neither I, my teacher, nor my school, will be identified in any presentations or publications that draw on this research.
- I understand that all data collected for this study will be kept in locked and secure facilities and will be destroyed after five years.
- I understand that my participation is voluntary and I may choose to withdraw at any time.
- I understand that I can receive a report on the findings of the study. I have written my email address below for the report to be sent to.

University of Canterbury Private Bag 4800, Christchurch 8140, New Zealand. www.canterbury.ac.nz

I understand that I can get more information about this project from the researcher, and that I can contact the University of Canterbury Ethics Committee if I have any complaints about the research.

I agree to participate in this research and my parents/guardians have also given consent on their consent form.

Full name
(student) _____
Class _____
Class Teacher _____
Signature _____
Date _____
Email address for report _____

Please return this consent form in a sealed envelope to your class teacher no later than Monday 16 May, 2011.

d) Consent from the Principal of School #1

RE: PhD research at [REDACTED] 2011

Vous avez répondu le 09/10/2013 14:01.

Date d'envoi : mercredi 9 octobre 2013 13:51

À : Ray Genet

Dear Ray,

How strange that there is no written record of the approval, as I do recall this being discussed at a Management meeting, where approval is given. So to rectify that, this email can be taken as confirming the verbal agreement for you to conduct your research.

I hope this fills the gap! Such approval does not require the sign off by our Board of Governors.

Regards

[REDACTED] | Principal
Girls' School

Visit [REDACTED] for enrolment information or to book a personal tour.

-----Original Message-----

From: Ray Genet [<mailto:ray.genet@pg.canterbury.ac.nz>]

Sent: Wednesday, 9 October 2013 1:46 p.m.

To: [REDACTED]

Subject: PhD research at [REDACTED] 2011

Dear [REDACTED]

I hope this finds you well. It is good to see that the school is back on its feet after the terrible damage inflicted by the earthquakes.

As you may recall in 2011 I was conducting case study research for my doctoral thesis with [REDACTED] and her Year 13 French class.

I am still in the process of data collation and analysis and I realise that I have an administrative gap.

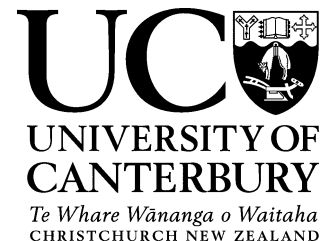
I received University of Canterbury Ethics Committee Approval to conduct my research with [REDACTED]'s class. I received written consent from [REDACTED] herself, the students and their parents

I received a verbal "yes" from you but unfortunately never received written consent from yourself or the Board of Trustees. I realise my research was not a high priority for the school given the upheaval of that period, but I would be very grateful if you could help me filling in this gap in the paper work.

kind regards

Ray

e) Information form for parents



Telephone: +64 3 [329 4777]
Email: [ray.genet@pg.canterbury.ac.nz]
[7/4/2011]

Project Title: Exploring Opportunities for Natural Science and Arts Integration through French

Dear Parent(s)/Guardian(s)

My name is Ray Genet, and I am a research student studying for a PhD in Education. The aim of my research is to describe and evaluate how learning occurs.

██████████ (HOD French) and I are planning to conduct a short in-class research project this semester that requires the participation of your daughter.

Your daughter's participation is entirely voluntary and requires her and your consent.

Please read this Information Form and make sure you understand what is required of your daughter. If you agree to allow her to participate please sign the attached Consent Form and have it returned it to ██████████ by Monday 16 May.

Teaching

In year 13 French this semester, your daughter will start a 5 lesson unit that looks at the connections between the natural sciences and the arts.

The unit has been carefully prepared by ██████████ (HOD French) and I. It is designed to both improve student French levels and challenge their ideas. It will give them a good reason to communicate in French, while providing them with real world experience in English-French interpretation and translation.

Observation

██████████ will teach the classes and I will observe them. Sometimes my thesis supervisor Dr. Lindsey Conner will join us. I will take notes and record the lessons on a tape recorder.

Unit contents

In the first lesson we will look at and discuss the medieval world view as represented in French art and literature of the time. In those days people saw themselves as in harmony with nature. Students will examine courtly love as an expression of this pre-modern view.

In lesson 2, students will look at and write about the modern world view of separation from nature. It is often expressed through the feeling that society is inauthentic. We will see how this is represented in the French environmental movement. Students will look at activists such as José Bové and his militant campaigns against MacDonald's and GMO.

In the last 3 lessons, carrying on the environmental theme, students will play the role of translators and interpreters. Their task will be to interpret a local conservation project for the French community in Christchurch. They will act as the interface between the experts and the interested French public. Students will produce a podcast. The unit will culminate in students explaining the Quail Island Ecological Restoration project to the French consul of Christchurch, Martine Marshall-Durieux.

The conservation project will be the Ecological Restoration Otamahua/Quail Island. This project was chosen firstly because it was the subject of my M.Sc thesis in Environmental Science. Also, the project receives support from the Pacific Conservation and Development Fund. This fund was set up in 1987 by the New Zealand government from money received from the French government in compensation for the bombing of the Rainbow Warrior. This makes a concrete connection with France and the island.

Students will visit the island and interview Trust experts and stakeholders. The island visit is planned for _____ June.

Research Interests

For the purposes of my PhD research I am interested in to what extent the unit:

- Enhanced student levels and performance in French
- Made students think about French in relation to their other subjects
- Has made students think about the world and the environment and so on
- Challenged, amused or disappointed students.

Data Collection and Treatment

In order to answer these questions students will be asked to complete a questionnaire at the beginning and end of the unit.

Also, they will be asked to keep a learning journal. Students are invited to write their honest thoughts, feelings and reflections about the contents of the unit, in either French or English. The purpose of the journal is to help students identify what and how they are learning. I will collect the journals as a source of research data at the end of the unit.

The journal and questionnaires will not be used for assessment. [REDACTED] will not read either the questionnaires or the learning journals.

Selected results of the study may be submitted for publication to national or international journals or presented at educational conferences.

Neither the school nor the students will be identified by name. Everything students write and say in class is confidential. Only my thesis supervisors and I will have access to this information. All data collected for this study will be kept in locked and secure facilities and will be destroyed after five years.

If you would like to get a copy of the future publication please do not hesitate to contact me.

Contacts

You may contact my supervisor and I if you have any questions about the study at any stage.

My email is: ray.genet@pg.canterbury.ac.nz

My supervisors' emails are: Dr. Lindsey Conner

lindsey.conner@canterbury.ac.nz

and Dr. Elaine Mayo

elaine.mayo@canterbury.ac.nz

Giving Consent

With this Information Form you will have received a Consent Form which indicates that you agree to allow your daughter to participate in this study. Your daughter has also received the same information with her own Consent Form.

As stated above, if you give permission to your daughter to participate, please sign and return the Parent(s)/Guardian(s) Consent Form to the teacher by Monday 16 May.

Please note that participation in this project is voluntary on the part of your daughter and subject to your approval. You can withdraw your permission, and your daughter can withdraw from the programme at any stage with no penalty. I will do my best to remove any information relating to her provided it is practically achievable.

If you do not wish for your daughter to participate do not sign the Consent Form.

Please note that this study has received ethical approval from the University of Canterbury Educational Research Human Ethics Committee, and that if you have any complaints please address them to:

The Chair, Room: 223 Wheki, School of Maori, Social and Cultural Studies in Education
Educational Research Human Ethics Committee, University of Canterbury, Private Bag 4800,
Christchurch (nicola.surtees@canterbury.ac.nz)

If you have any queries or need more information please don't hesitate to contact me.

Yours sincerely

Ray Genet M.Sc, Dip. Tchg. & Lrng. (Sec)

f) Information form for students



Telephone: +64 3 [329 4777]
Email: [ray.genet@pg.canterbury.ac.nz]
[7/4/2011]

Project Title: Exploring Opportunities for Natural Science and Arts Integration through French

Dear Student

My name is Ray Genet, and I am a research student studying for a PhD in Education. The aim of my research is to describe and evaluate how learning occurs.

From the beginning of the second semester every Tuesday with your teacher [REDACTED], you will start a 5 lesson unit in French that looks at the connections between the natural sciences and the arts.

The unit has been carefully prepared by [REDACTED] and I to both improve your French as well as challenge your ideas. It will give you good reason to communicate in French while providing you with real world experience in interpretation and translation.

[REDACTED] will teach the classes and I will observe them. Sometimes my supervisor Dr. Lindsey Conner will join us. I will take notes and record the lessons on a tape recorder.

In the first lesson you're going to look at and discuss the medieval world view as represented in French art and literature of the time. In those days people saw themselves as in harmony with nature. We will look at courtly love as an expression this pre-modern view.

In lesson 2 you will look at and write about the modern world view of separation from nature. It is often expressed through the feeling that society is inauthentic. We will see how this is represented in the French environmental movement. You will look at activists such as José Bové and his militant campaigns against MacDonald's and GMO.

Now in the last 3 lessons, carrying on the environmental theme, you will play the role of translators and interpreters. Your task will be to interpret a local conservation project for the French community in Christchurch. You will act as the interface between the experts and the interested French public. You're going to produce a podcast. The unit will culminate in you explaining the Quail Island Ecological Restoration project to the French consul of Christchurch.

The conservation project will be the Ecological Restoration Otamahua/Quail Island. This project was chosen firstly because I know quite a bit about it as it was the subject of my M.Sc thesis. Also, the project receives support from the Pacific Conservation and Development Fund. This fund was set up in 1987 by the New Zealand government from money received from the French government in compensation for the bombing of the Rainbow Warrior; making a concrete connection with France and the island .

I am interested in if, and how the unit challenged, amused or disappointed you; whether it helped your French and how it made you think about French as well as your other subjects; how has it made you think about the world and the environment and so on.

So to find all this out, I'd like you to fill out a questionnaire at the beginning of the unit and one at the end. Also I'd like you to keep a learning journal. You just write your honest thoughts, feelings and reflections about the things you have read and talked about in class, in either French or English. The purpose of the journal is to help you identify what and how you are learning. I will collect it as a source of research data at the end of the unit. The journal will not be used for assessment.

Your teacher will not read either your journal or your questionnaires.

Everything you write and say in class will be confidential, and I will not use your real names. Only my thesis supervisors and I will have access to this information. All data collected for this study will be kept in locked and secure facilities and will be destroyed after five years.

The results of my research may be submitted for publication to national or international journals or presented at educational conferences. If you would like to get a copy of the future article just send me an email.

You may contact me and my supervisor if you have any questions about the study at any stage.

My email is: ray.genet@pg.canterbury.ac.nz

My supervisors' emails are: Dr. Lindsey Conner

lindsey.conner@canterbury.ac.nz

and Dr. Elaine Mayo

elaine.mayo@canterbury.ac.nz

I will give you a consent form which indicates that you agree to take part in the study. There will also be one for your parents. Please return them to [REDACTED] by Monday 16 May.

You should know that your participation in this project is voluntary. You have the right to withdraw at any stage with no penalty. I will do my best to remove any information relating to you, provided this is practically achievable.

If you don't want to participate just don't sign the consent form, don't return the questionnaire and don't accept the learning journal.

Please note that this study has received ethical approval from the University of Canterbury Educational Research Human Ethics Committee, and that if you have any complaints please address them to:

The Chair, Room: 223 Wheki, School of Maori, Social and Cultural Studies in Education
Educational Research Human Ethics Committee, University of Canterbury, Private Bag 4800,
Christchurch (nicola.surtees@canterbury.ac.nz)

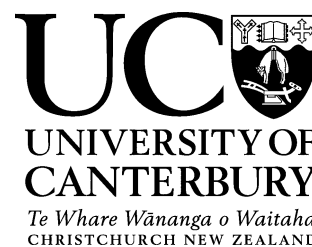
If you have any queries or need more information please don't hesitate to contact me.

Yours sincerely

Ray Genet M.Sc, Dip. Tchg. & Lrng. (Sec)

g) Information form for the teacher

Telephone: +64 3 [329 4777]
Email: [ray.genet@pg.canterbury.ac.nz]
[7/4/2011]



Project Title: Exploring Opportunities for Natural Science and Arts Integration through French

Dear ■■■

I have been asked by the University of Canterbury Educational Research Human Ethics Committee to provide an Information Form for you about our project. This will help you complete the Consent Form.

Much of the information provided here relates to the Brief given to the school administration of ■■■ and Information Forms for parent(s)/guardian(s) and students, and explains clearly your rights in relation to the study.

Here are the key points:

- What is important to note is that the project requires your consent and it is entirely voluntary. You are at liberty to withdraw your support at anytime for whatever reason.
- Student participation is also voluntary and requires their consent. They may withdraw at anytime without penalty.
- Even though students may be over 18 years old, their participation is contingent on their parent(s)/guardian(s)' consent.
- All the teaching of the material developed for this project is for your use, and you should feel free to edit and change it as you feel it is necessary.
- All the classes will be taught by you.
- I will observe and make audio recording of the lessons. I may be joined by my main thesis supervisor Dr. Lindsey Conner

- Students will be completing two questionnaires and a learning journal. These cannot be used for assessment and they are confidential; that is, you are not permitted to read them as it may affect your view of the students and impact on your assessment of them.
- The results of the study may be submitted for publication to national or international journals or presented at educational conferences. Neither, you, the school nor the students will be identified by name.

Teaching

In Year 13 French this semester, we will start a 5 lesson unit that looks at the connections between the natural sciences and the arts.

The unit has been carefully prepared by you and I. It is designed to both improve student French levels and challenge their ideas. It will give them a good reason to communicate in French, while providing them with real world experience in English-French interpretation and translation.

All classes will be taught by you. You are at liberty to deliver and edit the content of each lesson in any way you feel appropriate to ensure Achievement Objectives and Learning Outcomes are met.

Observation

I will observe classes. Sometimes my thesis supervisor Dr. Lindsey Conner will join us. I will take notes and record the lessons on a tape recorder.

Unit contents

The first lesson looks the medieval world view as represented in French art and literature of the time. In those days people saw themselves as in harmony with nature. Students will examine courtly love as an expression of this pre-modern view.

In lesson 2, students will look at and write about the modern world view of separation from nature. It is often expressed through the feeling that society is inauthentic. Students will see how this is represented in the French environmental movement. Students will look at activists such as José Bové and his militant campaigns against MacDonald's and GMO.

In the last 3 lessons, carrying on the environmental theme, students will play the role of translators and interpreters. Their task will be to interpret a local conservation project for the French community in Christchurch. They will act as the interface between the experts and the interested French public. Students will produce a podcast. The unit will culminate in students explaining the Quail Island Ecological Restoration project to the French consul of Christchurch, Martine Marshall-Durieux.

The conservation project will be the Ecological Restoration Otamahua/Quail Island. This project was chosen firstly because it was the subject of my M.Sc thesis in Environmental Science. Also, the project receives support from The Pacific Conservation and Development Fund. This fund was set up in 1987 by the New Zealand government from money received from the French government in compensation for the bombing of the Rainbow Warrior. This makes a concrete connection with France and the island.

Students will visit the island and interview Trust experts and stakeholders. The island visit is planned for _____ May.

Research Interests

For the purposes of my PhD research I am interested in to what extent the unit:

- Enhanced student levels and performance in French
- Made students think about French in relation to their other subjects
- Has made students think about the world and the environment and so on
- Challenged, amused or disappointed students.

Data Collection and Treatment

In order to answer these questions students will be asked to complete a questionnaire at the beginning and end of the unit. These will be done for homework so as to free up class time.

Also, they will be asked to keep a learning journal. Students are invited to write their honest thoughts, feelings and reflections about the contents of the unit, in either French or English. The purpose of the journal is to help students identify what and how they are learning. I will collect the journals as a source of research data at the end of the unit.

The journal and questionnaires will not be used for assessment. You are not permitted to read either the questionnaires or the learning journals.

Selected results of the study may be submitted for publication to national or international journals or presented at educational conferences. Neither, you, the school nor the students will be identified by name. Everything students write and say in class is confidential. Only my thesis supervisors and I will have access to this information. All data collected for this study will be kept in locked and secure facilities and will be destroyed after five years.

If you would like to get a copy of the future publication please do not hesitate to contact me.

Contacts

You may contact my supervisors and I if you have any questions about the study at any stage.

My email is: ray.genet@pg.canterbury.ac.nz

My supervisors' emails are: Dr. Lindsey Conner

lindsey.conner@canterbury.ac.nz

and Dr. Elaine Mayo

elaine.mayo@canterbury.ac.nz

Giving Consent

With this Information Form you will have received a Consent Form which indicates that you agree to allow me to your observe classes.

Your students and their parent(s)/guardian(s) have also received the same information with their own Consent Forms.

If you give permission to me to conduct research in your class, please sign and return the Teacher's Consent Form to me by Monday 16 May.

Please note that your participation, and of all those concerned, is entirely voluntary.

Students, parent(s)/guardians and you may withdraw consent at anytime for whatever reason without penalty.

If you or the students withdraw, I will do my best to remove any information relating to them and yourself, provided it is practically achievable.

If you, the students, the parent(s)/guardians do not wish to give consent, the respective Consent Forms should not be signed.

Please note that this study has received ethical approval from the University of Canterbury Educational Research Human Ethics Committee, and that if you have any complaints please address them to:

The Chair, Room: 223 Wheki, School of Maori, Social and Cultural Studies in Education
Educational Research Human Ethics Committee, University of Canterbury, Private Bag 4800,
Christchurch (nicola.surtees@canterbury.ac.nz)

If you have any queries or need more information please don't hesitate to contact me.

Yours sincerely

Ray Genet M.Sc, Dip. Tchg. & Lrng. (Sec)

APPENDIX 4:

QUESTIONNAIRES

Pre-unit Questionnaire

Dear Student

- Please complete this questionnaire today and bring it to class tomorrow
- This is not a test
- There are no right or wrong answers to the questions – just say what you honestly think
- Don't consult with anyone and don't look up answers on the internet to help you
- Please take your time to answer the questions
- Your answers are confidential, so don't show anyone what you wrote
- Thanks for taking the time to complete this questionnaire

Best wishes

Ray Genet

Personal details

- Name: _____
- Age: _____
- Ethnic group: _____
- Religion: _____

Your learning

- What is your favourite subject at school and why?

- What are you especially good at school and why?

- **What do you need help with at school and why?**
- **What distracts you from your studies/homework?**
- **Describe how you learn best in class.**
- **Describe how you study for an exam?**
- **What kind of information do you find most easy to remember and why?**
- **What is the most amazing thing you have ever learnt at school? What did it feel like before, during and afterwards.**

French

- **Why are you studying French?**
- **What do you like about studying French?**
- **What do you dislike about studying French?**
- **What is the point of studying French in New Zealand?**
- **Do you think you will continue studying French after you leave school?**
Strongly agree – Agree – Disagree – Strongly disagree
- **Would you like to get a job where you can use your French?**

Strongly agree – Agree – Disagree – Strongly disagree

- **How would you categorise your level of written French**

Excellent - Merit - Achieved - Not Achieved

- **How would you categorise your level of spoken French**

Excellent - Merit - Achieved - Not Achieved

- **How would you categorise your level of aural understanding of French**

Excellent - Merit - Achieved - Not Achieved

- **How would you categorise your level of French vocabulary**

Excellent - Merit - Achieved - Not Achieved

- **How would you categorise your level of French grammar**

Excellent - Merit - Achieved - Not Achieved

Post-Unit Questionnaire

Dear Student

- **Please complete this questionnaire now**
- **This is not a test**
- **There are no right or wrong answers to the questions – just say what you honestly think**
- **Don't consult with anyone**
- **Please take your time to answer the questions**
- **Your answers are confidential, so don't show anyone what you wrote**
- **Thanks for taking the time to complete this questionnaire**

Best wishes

Ray Genet

Personal details

- Name: _____
- Age: _____

Unit review

α

- When did you feel most confused/ stuck? Describe what you were stuck on.
- Have you adopted new values, views, ideas, or opinions since the beginning of this unit?
Strongly agree – Agree – Disagree – Strongly disagree
- What new values, views, ideas, or opinions have you adopted since the beginning of this unit?
- How have these new values, views, ideas, or opinions affected other things you study at school?

r

- What were the liveliest debates/discussions you had with classmates, others outside the class or even with yourself about the topics in this unit?
- What ideas did you reject?
- What ideas did you accept?

K

Have your established ideas about New Zealand and France and their people, the world, your life, the study of French etc., been revised since the start of this unit?

Strongly agree – Agree – Disagree – Strongly disagree

Explain:

Ω

What event(s), text(s), image(s), word(s), discussion(s), caused you to rethink your established ideas about New Zealand and France and their people, the world, your life, the study of French etc., ?

Your learning

- **What is your favourite subject at school and why?**
- **Describe how you learn best in class.**
- **What kind of information do you find most easy to remember and why?**
- **What is the most amazing thing you have ever learnt at school?**

French

- **Why are you studying French?**
- **What do you like about studying French?**
- **What do you dislike about studying French?**

- **What is the point of studying French in New Zealand?**

- **Do you think you will continue studying French after you leave school?**
Strongly agree – Agree – Disagree – Strongly disagree

- **Would you like to get a job where you can use your French?**
Strongly agree – Agree – Disagree – Strongly disagree

- **How would you categorise your level of written French**
Excellent - Merit - Achieved - Not Achieved

- **How would you categorise your level of spoken French**
Excellent - Merit - Achieved - Not Achieved

- **How would you categorise your level of aural understanding of French**
Excellent - Merit - Achieved - Not Achieved

- **How would you categorise your level of French vocabulary**
Excellent - Merit - Achieved - Not Achieved

- **How would you categorise your level of French grammar**
Excellent - Merit - Achieved - Not Achieved

Last questions

- **Do you think your French improved as a result of this unit?**
Strongly agree – Agree – Disagree – Strongly disagree

Explain:

Do you think your world view has changed as a result of this unit?

Strongly agree – Agree – Disagree – Strongly disagree

Explain:

- **What did you most like about this unit?**

- **What did you most dislike about this unit?**

- **Would you recommend this unit as away to improve one's French?**

Strongly agree – Agree – Disagree – Strongly disagree

- **How could this unit be improved?**

Final comments: Say in a few words what you think of this unit

APPENDIX 5:

STUDENT PROFILES

Student L4 Profile

Identity: L4 declares her ethnic group as “Kiwi”, and her religion as “Christian”.

Learning: In the Pre-unit questionnaire L4 considered that she had a level of spoken French of ‘Achieved’ on the NCEA scale. After the unit she said she believed she had a level of ‘Merit’.

Evidence from tape scripts reveals L4 learns while exteriorising her thoughts and seeking feedback from her classmates, notably from L1. However, there is much evidence that L4 lacks autonomy but does not include this in her questionnaires. Often when she has a query rather than thinking it out she will vocalise her question in an inchoate form and insist that notably L2 and L5 consider her question. L4 appears to override the resistance of L2 and L5 in cooperating but instead reminds them that they should help. This may indicate a certain resilient confidence. Her questionnaires reveal she believes she is especially good at “Science and English”. She declares she needs help with “Time management” because she says “I’m busy.” For her learning technique in class, in the pre-unit questionnaire she writes, “Learn then take notes”. This is in part consistent with evidence from tape scripts where she verbalises a problem then works it out with classmates and once understood she writes the concept down (see Lessons 1 and 10). However, she omits her vocal reliance on classmates to interpret texts and the teacher’s explanations in French.

Clubs: In terms of school activities she is involved with Jazz band (Lesson 12 lines). She participated in the Annual Southern Jam Youth Jazz Festival. She plays bass and won the Gold award. L4 was recipient of Massey University Conservatorium of Music Award for the Most Outstanding Bassist, Silver award at the CPIT Jazz Quest competition (School News, Oct. 2011). L4 initiated the school Philosophy Club only to drop out owing to disagreements with junior atheists who wanted sex education for primary school students! (Lesson 11). In

2010 with L3, L4 invited university lecturer to the Philosophy Club to respond to Richard Dawkins' critique of religion and to seek a science/religion merger (School News, 2010).

School Responsibilities: L4 awarded the 'Prize for the Best All Round Girl in the School' (School News, Dec. 2011). She was 'Head of Community Service' one of the eight school student heads. L4 volunteered to help clean up school grounds before the school's reopening after a natural disaster in February 2011. L4 helped to plan World Vision concert for the '40 Hour Famine'. L4 organised the 'Harvest Festival where students collected non-perishable food and other essentials for the City Mission that distributes supplies to the city's residents in need (School News, 2011).

Society: At the beginning of the Unit of Work L4 declares that she feels neither separate nor part of New Zealand society but somewhere in between. Afterwards she stated that she felt "part of society". It is not certain that the Unit of Work played a role in this shift in world view, as she may have been influenced by other classes. However, her podcast expressed exuberantly her epiphany that she realised that "Nature was alive". In the post-unit questionnaire L4 states that the most amazing thing she has ever learnt at school is, "The power and connectivity to other cultures language brings."

Maori culture: At the beginning of the unit she declared Maori culture to be a cool part of New Zealand culture but she felt "...it's slipping away." Her comment related to the difficulty of the language and that the language is said to be "dying out". Evidence showed that she learnt the connection between pre-modern world views in French medieval society and the connection with the Maori world view but that stated that this is not new to her.

The Environment and Conservation: Vegetarian (Lesson 11). Before and after the Unit of work L4 agreed that global warming was real. Before the unit she agreed that humans were the cause, however after the unit she was less certain indicating that she neither agreed nor disagreed. This indicates a shift in values that she does not acknowledge at the beginning of the post-unit questionnaire. In response to the question 'how do you see yourself in relation to Nature? L4 indicated that she was 'a part of Nature' and wrote "I'm one with nature." After the unit she indicated that she saw herself as 'Somewhere in between'. This is a firm shift in values. The explanation could be attributed to the study of world views that explained the difference between pre-modern, modern and ecological postmodern world views (see Lesson 6). Her shift in values here is likely to be a result of her learning about the range of world views in Lesson 6 given that she appears to have a tendency to accept information from the

teacher (see response to Science and Arts question in the post unit questionnaire where she accepts the connection because she was told it exists). She indicated that invertebrates “freak her “out”, “especially spiders” and this did not change. Before the unit she said exotic organisms are “nice to look at” but afterwards said that they are all good so long as they are not pests.

Curriculum Integration - consilience: Before the commencement of the Unit of work L4 disagreed that there are connections between the sciences and the creative arts. For her explanation she said, “They’re all forms of displaying intellectually, but not directly linked, except chemicals in paint.” In other words L4 seems to be saying that the commonalities between sciences and arts are their intellectual displays, and that the artistic medium can be defined chemically. At the end of the unit she agreed that there were in fact link between the creative arts and sciences. Her reason this time was, “Because that’s what you told us”. L4’s answer may be indicative of a lack of learner autonomy (see Little, 2007) and what Freire refers to as the ‘banking model’ of education. Where knowledge is deposited into the mind of the learner in exchange for resources, putting the teacher in the role of expert/vender and student in the role of subordinate recipient/client. L4’s answer is consistent with her learning of French where the teacher deposits knowledge of vocabulary, grammar and culture into her mind. This would possibly explain the fact that her French oral level was not operational and that this was a source of frustration for her (see ‘French’ this section). When asked whether she thought there were connections between the sciences and social science she ‘strongly agreed’. She explained that, “It’s all brain science, how our brain and conscience influence the world.” After the unit she was less certain, only agreeing. Giving though a similar explanation, saying that, “Because we use our brains, the study of brains is a science.” When asked if she thought it was necessary to learn these connections she agreed. After the unit she was less sure, indicating that her opinion was between agreeing and disagreeing. She explained her position by saying, “not for survival”.

Subject integration: L4 believes that teachers at her school integrate subjects between Learning Areas and this did not change over the course of the unit giving the example of Classics as doing this. However, she claimed at the outset of the unit that she connected up inter Learning Area subjects, but at the end of the unit she said she did not agree that she did so. L4 does not explain this discrepancy. With the subjects before the unit she disagrees that her teachers connect topics, after the unit she strongly disagrees that they do this. In regards

to her own linking of topics at the outset of the unit she agreed that she does connect topics but at the end she stated that she strongly disagreed that she did this.

Relationship with teacher: L4 states in the Pre-unit questionnaire she studies French "*parce que c'est une belle langue et ma classe est très géniale*" (because it is a beautiful language and my class is very cool) that the reasons she likes French is for "*mon professeur et mes camarades de classe*" (my teacher and my classmates). L4 appears to accept the teacher's authority as evidenced in **never** interrupting her turns except for sounds of agreement. However, it is possible that L4's acquiescence is recompensed with the teacher's compliance to give L4 language whenever she requests it. Of all the students in the class L4 was the most vocal. L4 did not hesitate to call out questions relating to vocabulary and for translations to the teacher. The teacher in all instances responded immediately and without hesitation with apparent acquiescence to L4's demands (Lesson 10). A delay in an answer occurred when the teacher needed to consult a dictionary. This could be counted as evidence of the Nash Equilibrium between teacher and student where the student's giving of attention and loyalty to the teacher is repaid with instantaneous translations.

Relationship with peers: L4 would share information and her questions with others in the class. She appeared to expect reciprocity (Lesson 10).

Project partnership: L1 worked as scribe and sounding board for L4 in working towards the oral presentation.

Student L5 Profile

Connectedness (Participating and Contributing)

- **Identity:** “NZ – European”
- **Religion:** “ –“
- **Clubs:** ATCL Speech and Drama (School News, 2011), coaches school hockey team (Lesson 10)
- **Learning:** There is evidence that L5 does not display autonomy but is dependent on L2 in regards precision of translation, vocabulary and grammar (see Lesson 11). L2 also serves as an occasional moderating force for L5’s cynicism and critique of others in the class (see Lesson 11 destroy the universe comment). In the before the unit questionnaire she said she learns best in class by “Writing, discussing, etc...” After the unit she said she said she learns best by “Enjoying what I’m learning.” In regards studying for an exam she says she does not really study: “Not a lot at all...” The information she finds most easy to remember is that which is “Written repeatedly or learnt repeatedly.” After the unit she adds “Things I write down. Interesting things.” For L5 the most amazing thing she has ever learnt at school is “languages” as “They open up to so many opportunities and to different worlds and cultures.” At the beginning of the unit L5 stated that she did not have a favourite subject liking all equally. At the end of the unit she claims that **French** is her favourite subject **reiterating** that she still likes the others: “French in particular, but I like them all. I chose them because I like them. Love languages.” Concerning French L5 according to the teacher was the strongest and most fluent of the students in the class. She hosted a French student for two terms and spent most of the six week New Zealand summer holidays in France with her exchange partner and her family. Nevertheless, she still appeared to have trouble with spontaneous French. She was not successful in forming complete sentences in French spontaneously without code switching or assistance from others in the class. L5 says she likes all her subjects, “Because I have chosen subjects that I like and am good at.” She is studying French, Classics, Japanese, History, and Maths. She says she is good at all her subjects as she says she enjoys them. She says she does not need help with her subjects although she says “I do need to be pushed.” She says she find “Everything” distracting.

- **School Responsibilities:** Language Faculty helped raised money for sister school in Kenya (School News, December, 2011).
- **Society:** French exchange -Like L1, L5 also hosted a French exchange student from February to July 2011. She also spent most of the Christmas holidays with her exchange partner in France. She also claimed that her conversational French improved owing to these experiences (School News, July, 2011). L5 reports that she feels part of society both before and after the Unit of Work. Note that this is in spite of the inauthenticity of the New Zealand *100% Pure* advertising campaign and the fact that her and her partner L2 made this the focus of their podcast.
- **Maori culture:** Note that L5 declares that the talk with the Maori representative caused her to rethink her established views about New Zealand but did not change her feeling about Maori culture. L5's feelings about Maori culture did not change during the unit. She considers the culture of the Maori "cool", but she says it "Doesn't have a lot to do with me" and notably after Lesson 5 that included the class visit of the representative from Bird Island. Her role was to communicate the Maori values of the island which students would translate into French to communicate to a French public.
- **The Environment and Conservation:** In the post-unit questionnaire L5 claimed that she accepted the idea that "...we should care about the environment." This comes in contrast to her ironic and mocking treatment of the earnestness of the environmental movement in Lesson 9 in response to the teacher's demoralising criticism of her podcast. L5 believes that global warming is real and this opinion did not change over the unit. She became less certain that humans were the cause of global warming over the unit. Her feelings about herself in relation to nation did not change, she considers herself as 'somewhere in between'. Her feelings about invertebrates did not change either saying: "They creep me out." And "They gross me out..." before and after. She thought that exotic species were "pretty" before the unit and after she said, "Native are good but there is nothing wrong with the non-natives."
- **Curriculum Integration - consilience:** Before the unit L5 agreed that there were connections between the sciences and the creative arts. She explains saying, "Well obviously things in the arts sometimes base ideas off sciences." Her reply after the unit did not change but she explains her answer saying, "Because you just told us that..." Note that the reply is very similar to L4's for the same question. It is possible that there was collusion here. L5 agreed that there are links between the sciences and

the social sciences. Her answer before the unit was, “Psychology is a science but also teaches you about social habits etc.” After the unit she wrote “Social studies etc. link in with ideas in science such as geology etc.” She agreed that it is important to learn these connections and this opinion remained constant over the course of the unit.

Before the unit she agreed that teachers integrate subjects in the curriculum before the unit but was less certain afterwards indicating on the Likert scale between agree and disagree. She indicated the same level of uncertainty for her own integration of subjects and this did not change over the unit. As for the integration of topics within subject areas she initially agreed her teachers did this but after the unit ‘disagreed’ that they did this. For herself she was initially uncertain whether she integrated topics within subjects. Afterwards she was more certain and disagreed that she did this. In conclusion L5 appears to have become more aware of the process of integration and has realised that over the course of the unit that neither her teachers nor herself does this.

- **Relationship with teacher:** The teacher considered L5 to be the strongest student and the most fluent having spent some time in France. The relationship between the teacher and L5 up until Lesson 3 appeared to be convivial and ingratiating with L5 giving supportive laughs and affirmations especially when the teacher spoke French. L5 was it seemed always in agreement with the teacher notably when the teacher was in disagreement with the content of the initial lessons (see Lesson 1). Teacher had an affinity for the landforms around the region and in particular the harbour. L5 lived in the harbour region and would remind the teacher of this in way that appeared ingratiating. The relationship of complicity diverges in Lesson 3. L5 verbalises that much of New Zealand landscapes are denuded and “boring”. This attitude is crystallised when students review the controversial advertising campaign 100% Pure New Zealand in relation to high levels of water pollution and the dire state of biodiversity in this country. Their relationship collapses in Lesson 9 and does not recover to its former state during the course of the unit in spite of efforts from the teacher to redress it through ingratiation (see lesson 10).
- **Relationship with peers:** As with other member of this class her loyalty resides with their project partners. On two occasions L5 attempts to form coalitions with her classmates through irony, mockery and laughter against the teacher (Lesson 3) and other students (Lesson 10). L5 is noticeably stronger than others in the class. She

seems at times to play this down, notably in her use of the 'be like' structure makes her sentences disjointed and give her utterances less certainty (see O'Leary Wanket, 2006) (Lesson 1). L5 was the most self-conscious in regards to the presence of the recording devices and appeared most flattered by their presence (Lesson 1). It is possible that she played up to the devices (Lesson 1), in the same way she would whisper or avoid them so as not to be recorded (Lesson 9). L4 often consulted L5 for vocabulary and grammar before asking the teacher.

- **Project partnership:** L2 was the scribe and sounding board for L5. L2 appeared more grounded and less mocking than L5.

APPENDIX 6:

CONTRIBUTION TO LESSON 9 FROM V. BURROWS

Saturday 18th June, 2011

The ecological restoration of Quail Island

This is an altruistic and cooperative project to restore Quail Island in the Rapaki territory on Lyttelton Harbour. But I'm not here to talk about that yet-

I'd like to begin about 17,000 or so years ago. The last major ice-age had affected the Northern Hemisphere deeply. The small family groups which followed game animals south settled near their food source in the sheltered sunny valleys of the south. They carved bone and stones with images and made simple pottery. In the warmer areas pottery shards revealed a progressive sharing of pottery styles and decoration between groups close to each other for the first time. At Lascaux, north of Montignac in the Dordogne Stone Age artists left magnificent cave paintings which have shown us that artistic expression had risen to expert levels by that time. Their knowledge and love for their natural world (and the fear) is recorded and we recognise it. So we have artistic expression, hunting skills, a love and deep knowledge of the natural world (and fear) is recorded and we recognise it. So we have artistic expression, hunting skills, a love and deep knowledge of the natural world, and cooperation which led to a higher level of social behaviour. Handprints gathered in quiet recesses of the caves suggest group behaviour - what were they uniting against? (earthquakes and fire and ice perhaps.)

All this is relevant to the differently expressed Age of Courtly Love, which originated among a small stratum of educated rich and powerful people who loved the country-side and their sociable hunting parties, and then evenings of celebrating. They were continuing a tradition expressed about 16,000 years earlier at Lascaux and in other such caves. That tradition is still expressed in simpler ways, with less elegant expression. In the 12th Century Eleanor of Aquitaine took this style of life to the French court when she married Louis VII. She bore

him two daughters but left him for Henry II of England. Courtly Love spread widely in Eastern Europe but is a stylised expression of human behaviour, an artistic imitation of old realities. It was as if they were watching themselves in a mirror as they hunted and sang and strummed and danced and lived as an art form, playing idealised courtships in their endless leisure – unless there was a war nearby.

But remember that, just as it took thirty men to serve an armoured knight and his horses bound for a crusade, it took hundreds of hard working servants to maintain the apparently effortless lifestyle of the nobles. And remember also their lifestyle was maintained in service and associated privileges, and these will have been delightful gossip. Remember also that for the rich and powerful young people did not choose their mate so there was no guarantee of love or happiness. Think what a help and delight the Art of Courtly Love brought to these /theses society/ies, and what opportunities it offered for something more without overt risk!

Sorry, the Quail Island project is not like Courtly Love, but offers a **marvellous** chance for cooperative work (with visible results) so it is both rewarding and a basis for genuine friendship and communication

Best wishes to you in your studies and far beyond.

Vivienne Benzie Burrows

17 Collina Street

Avonhead

Christchurch 8042

Ph. 03 348 3880

APPENDIX 7:

GLOSSARY OF MAORI TERMS

Glossary of Maori Terms	
Ōtamahua	Quail Island
Pākehā	European
Te Reo	Maori language
Whakapapa	Genealogy
Whakaraupō	Lyttelton Harbour, Canterbury, New Zealand

APPENDIX 8:

EXTRACTS FOR CHAPTER 5 RESULTS 1

Table 8.1- a key of Conversation Analysis transcription conventions

Conversation analysis conventions	Explanations
[]	Beginning and end of overlapping speech
= =	Latched speech – utterances follow one another with no discernible break
(0.5)	Numbers in brackets represent a pause in tenths of a second. Pauses were rounded up or down to the nearest tenth of a second
(13m58)	Audio position on recording: m = minutes
(.)	Micro pause of less than one tenth of a second
.	Falling intonation
?	Rising intonation
,	Continuing intonation
::	Prolongation of a sound
-	Cut off or self-interruption
<u>Word</u>	Emphasis
◦	Softer talk
↑↓	Rise and fall in pitch
> <	Talk is rushed
< >	Talk is slowed down
(,h)	Audible intake of breath
(h)	Audible expiration
(heh snort)	Unvoiced laugh through the nose -single syllable
(heh pant)	Unvoiced laugh through the pant -single syllable
(ha)	Voiced laugh syllable
(Humha)	Voiced closed mouth laugh
.....	Laugh speech
£	Smiley speech
(0)	Yawn speech – phrase uttered while yawning.
/...../	Sentence is translated directly from written French.
{.....}	Sentence said with a “vocal fry” or croaky voice
Word	Capitals represent louder speech

(())	Double brackets will contain a description of events; such as, ((telephone rings))
(((2.1)))	Double brackets with decimal number indicate that there was a noise and the duration of the noise.
(word)	This is the likely or possible word or phrase
()	Word or phrase cannot be discerned
(S)	Identity of speaker cannot be discerned
(S S)	Students making an utterance collectively – identities cannot be discerned
(L#)	Student identity is not certain but likely
‘a’	Letter between quotation marks indicates a letter is spelt out
“ word/phrase”	Speech marks indicates that the speaker is reading a text
(“ word/phrase”)	Speech marks in brackets indicates that the speaker is probably reading a text
«word/phrase »	French speech marks indicate the text is in French
([°])	irony /sarcasm
♪	Sentence is sung
LS	Lip smack
Tut	Dental click – expresses disapproval

Extract 1 - Lesson 1

Extract 1, Lesson 1

1. T: OK. (0.4) <des idé:es.>
2. **OK.** (.) < some ide :as.>
3. (0.2)
4. ((pen click))
5. T : °L6 tu as::° -↑?
6. °L6 do you have::° -↑ ?
7. (0.7)
8. L6 : <ah :: « ‘je crois c'est comme : (.) Shakespeare↑ : et l’amour. qui.↓- (0.6) quew-
9. qu’i :l. écrit? dans ses sh. - > (0.2) <histoires’↑ ?>
10. **I believe it’s like: (.) Shakespeare ↑ : and the love. that h .↓- (0.6)**
11. **tha- that he write in his sh - > (0.2) < stories ↑ ?>**
12. (0.5)
13. T:: ouais ?
14. **Yeah**
15. L6: °peut-être° ?» (heh pant)

16. **perhaps (heh pant)**
17. (ha) (ha)
18. L5: 'pour moi, je ne comprends pas beaucoup le mot
19. **for me I don't understand the word**
20. 'court - (.) court (.)tois' (.) [mais
21. '**court-(.) court(.)ly** [but
22. :(L2) [(heh snort)]
23. ((pen click))
24. L5 : je crois c'est un- (0.1) *forme de l'amour.* un peu vieux'.
25. **I believe it's a - (0.1) *form of love.* a little old**
26. (0.6)
27. (L5) : (h.) (heh pant)=
28. SS:=(voiced laughter rising in volume) =
29. T: =pourquoi pas oui (.) L4?
30. **why not yes (.) L4?**
31. L4: mine's in English because I didn't know[(()
32. T: °>that's alright. <°↑ -
33. (SS): [((voiced laughter))]
34. L4: it (0.4) >reminds me of court.ship< (.) kinda like- (0.8) going back in history
35. like (0.4) or even jus' (0.4) >>fifties (.) go (back)<< >the cute way of winning over a
36. person? (.) it's that traditional romantic- it' s no:t li,ke texting.< (h.) =
37. L5: =yeah=
38. L4:=or like one night stands before.- =
39. SS: =(voiced laughter)=
40. (09m25) :L4: and all that stuff (.) it's that you win the person over with your
41. <char.m.> but then also in <his,tory> it (0.4) involved a lot about (0.4) a person's
42. wealth and social stat°us° <↑and things °like that°↑> ((sniff)) =
43. T: =o ?h. hmm : (.) très. bien
44. **very good**
45. L5:>>° I don't know how to write that in French° << £
46. (L2): t'(heh pant) ye:ah =
47. L5: = (HA) (h.) (HA) (h.) (HA) (h.) (ha) (h.) =
48. L3: = I WROTE - (0.1) < 'love in °medie.val° °°times:..°°> =
49. T: °oui°
50. (L1) (Humha)(Humha)(Humha) (h.)
51. (L3): (Ha) (heh pant)
52. T: L2?
53. L2:> hmm yeah I haven't really written anything but I'll say [(that)£ as well
54. (ha)(ha)(ha)]
55. SS: [(HA) (HA) (HA)]
56. S:
57. S: [ye,ah.(ha)(ha)(ha)]
58. T : L1?
59. S: (h.)
60. (0.6)
61. L1: AH:: errh.(0.3) °ah ::er↑° 'je ne sais presque rien (0.5) ah ::. mais
62. **I know next to nothing (.) ah but**
63. l'amour courtois me semble' - do you say 'être' or 'd'être'? (0.9)
64. **courtly love seem to me - do you say (.) 'to be' or 'of to be'**
65. T: d' être

- 66. **'of to be'**
- 67. (0.4)
- 68. L1: 'd'être (0.4) une idée assez (0.3) démodée'
- 69. **to be (0.4) an idea quite (0.3) outdated**
- 70. (0.9)
- 71. S: ()
- 72. T : démodée
- 73. **outdated**
- 74. L1: >outdated<=
- 75. T:=d'accord
- 76. **ok**
- 77. (1.5)

Extract 2 – Lesson 1

Extract 2, Lesson 1

78. : T: so::
79. : (1.1)
80. S : (whispering)
81. T: ss-ss-c'est vrai en fait que ça vient du <<moyen âge>>
82. **i-i- it is true in fact that it comes from the <<middle ages>>**
83. S : (unvoiced giggling)
84. T : et : (0.4) j'ai écrit en anglais °()° (.)
85. **And: (0.4) I wrote in English °()° (.)**
86. 'a highly stylised code of behaviour popular chiefly °from the twelfth and the
87. fourteenth century° ((pen click))
88. S: (h)
89. T: . that describe the rules of conduct between lovers (0.9) advocating idealised but
90. illicit love (.) that means ((pen click)) outside of ((pen click)) marriage (0.8)
91. and which fostered an extensive medieval ((pen click)) literature based on this
92. tradition¹ (0.3) >that's an interesting definition because I think um (0.3) one of the
93. definitions is (0.3) did it actually exist outside of literature. (0.3) or was it an idea. =
94. L4: =yeah like Pride and Preju°dice:::° °°(thought I'd stick that in there)°°
95. T: °<yeah.>°
96. S: (heh pant)
97. T : so um er (0.1) I quite liked <your:> [(0.3) way: (0.3)] of thinking (0.4) °L4°²
98. S: [(ha)(ha)(ha)]
99. L4: °yep it was deep°
100. SSS ((laughter))
101. T: it was part of the (0.9) the medieval French way of looking at the world
102. (1.3) >courtly love.<
103. mais pourquoi est-ce qu'on parle de l'amour courtois quand c'est un thème de
104. **why are we speaking about courtly love when it is a theme of the**
105. l'environnement↑ ? (0.6) bonne (0.5) question.↑
106. **environment (.) good question?**
107. 11:06 SSS ((laughter))
108. T: <c'est parce que :: err (0.5) la vision (1.3) des gens du moyen âge (1.7)
109. était une vision de la nature de l'amour de Dieu et de nous (0.5) tout :: tout
110. était ensemble>=
99. **It's because the world view of the people of the middles ages was a view**
100. **of nature, love, God, all was together**
101. S := >>hmm hmm<<
102. T : en fait (0.5) ET APRES (0.5) on avait (0.6) reculé un peu
103. S : ((cough))
104. **in fact (0.5) and after (0.5) we had (0.6) stepped back a little**
105. (0.8)

¹ Teacher's source is: Dictionary.com

² It is not clear whether the teacher likes L4's comment on Pride and Prejudice or her definition of Courtly Love.

106. <pour regarder (0.3) la nature : étêtera. comme si
 107. < **to look at (0.3) nature etc as though**
 108. c'était à l'extérieur de nous. donc il y avait un changement
 109. **it was exterior from us (.) so there was a change**
 110. de vision (0.7) du monde> °donc vous- vous comprenez↑?° =
 111. **in world (0.7) view > so do you understand?**
 112. (L2) : =hmm hmm↑
 113. T: >>c'est un- c'est un peu difficile à comprendre (.) mais
 114. >>**it's a little difficult to understand (.) but**
 115. c'est c'est ça<< le sens (0.4) >je crois< (0.8) d- du projet(1.0)
 116. **that's << the meaning (0.4) >I think< of -of the project (1.0)**
 117. pour- (0.1) pour- (0.3)
 118. **to - (0.1) pour - (0.3)**
 119. comprendre (0.5) la vision (0.9) du monde (0.6) français (0.8) par rapport à
 120. **understand (0.5) the world (0.9) view of (0.6) the French (0.8) in relation**
to
 121. la conservation (0.2) et : (0.7) l'environnement.
 122. **the conservation (0.2) and: (0.7) environment**
 123. (0.8)
 124. S: (eek)
 125. (0.6)
 126. ((small metallic object dropped on the desk))
 127. T: et puis on va faire ça (0.7)
 128. **and then we are going to do that**
 129. ((pen click))
 130. (0.4)
 131. encore par rapport à Quail Island
 132. **again in relation to Quail Island**
 133. qui :: (0.4) est dans notre (0.8) jardin
 134. **tha::t (0.4) is in our(0.8) backyard**
 135. °si vous- *si vous voulez.*° (ha) d'accord ? (0.6) pour ça qu'on on passe un
 136. peu du temps avec
 137. ° **if you – * if you like *°(ha) ok for that we are spending a little time with**
 138. l'amour courtois.
 139. **courtly love**
 140. (4.0)
 141. T: so courtly love is an expression of the medieval w- world view.

Extract 4 - Lesson 1

Extract 4, Lesson 1

1. T : donc l'amour était un sujet très important pour les gens du moyen âge. (.)
2. **so love was a very important subject for the people of the middle ages. (.)**
3. ils ont beau↑coup parler (0.4) ça fait partie de leur vision du monde (2.8) (Aucassin)
4. ()
5. (2.9)
6. **they spoke about it a lot and it made up a part of their world view (Aucassin) ()**
7. **(2.9)**
8. OK the stages of courtly love
9. ((pages turned)) (1.7)<(il faut) > penser un peu (0.4) * >maintenant< * (0.4)°
10. **(page turned) (1.7)<(it's necessary) to think a little (0.4) *now* (0.4)°**
11. je vous pousse un peu de.°(1.0)me joindre sur ma <vision.>=
12. **I am encouraging you to join me in my <point of view>=**
13. S : = (h)°ha ha ha ha ° (.h) (h)hmm
14. T: de (.) ce qui se passe avec les animaux (0.5) qui font >le< < la> cours aussi. (2.2)
15. **what happens with animals (0.5) who court also (2.2)**
16. °font t-° faire la cours? (0.5) is to (0.4) court >or be courting < a courtship. >and<
17. **to court**
18. les animaux font ça aussi (0.8) °oui° (0.4)
19. ... **the animals do that also (0.8) °yes ° (0.4)**
20. (L5) : oui=
21. **Yes**
22. (L6) : =↑hmm[m :. ³
23. T : [il y] a un processus. (0.8)
24. **there is a process (0.8)**

³ Two students L5 and L6 appear to have understood that there is a connection between courtly love and animal courtship – a possible ah-ha moment for learners. These students had a clear understanding of the Darwinian connection between courtly love and animal courtship proposed in the readings and attempted to convince L4. This is a possible example where students have acquired knowledge through the medium of the French language.

Extract 5 - Lesson 1

Extract 5, Lesson 1

1. T : worship of the lady from aFAR :.
2. SS: ((whispering))
3. T : declaration of passionate devotion. (.) virtuous rejection by the lady↓. (0.5)
4. renewed wooing with <odes.> of virtue and eternal passion and fealty. (.) that's like
5. servitude and so on. (1.0)
6. ((pen click))
7. (0.2)
8. T : [MOANS of approaching death. through unsatisfied desire. (.) that's usually the
9. man going oh! (h) I was gonna <<die:.>> if you ↑don't. –
10. [((pen clicking))]
11. ((pen click))
12. T: fulfil↑(.) my (.) love.
13. (L5): Ha-[ha ha
14. (L3) [HA ha.]↑ha ha ha ha .
15. T: >>and other physical manifestations of lovesickness<<that's he doesn't eat he
16. doesn't
17. ((pen click))
18. T: (0.6) sleep he just a [WRECK because he's in <love.>=
19. (L4): [()]
20. (S)= yeah=
21. (S) =↑ha ha ha ha
22. T: and HEROIC deeds of valour which win the lady's heart (0.5) consummation of
23. the secret love (.) not always though. that's (0.3)
24. ((pen click hard on desk))
25. T: °whatever° (0.3)and endless adventures and subterfUGes avoiding detection(.
26. because that means they've got to hide because that makes it more exciting (0.7)
27. L3:[laughter]
28. SS:[laughter]
29. (L4): °(bit of)° drama. ↓

Extract 6 - Lesson 1

Extract 6, Lesson 1

28. (L1): (bit of) drama.
29. T: the BOOK that I was: - (0.3) going to be writing with my (0.3) <ex> (.) -PhD
30. su[pervisor
31. L4: [did ya get] out of it?
32. (0.4)
33. T: *yeah (h)* °°I didn't (go and do it)...°°
34. SS: ((VOICED LAUGHTER))
35. °he's not *going to play this to (.)°° (anyone are you?...°° ((heh)...
36. S: (.) (h) ha ha ha
37. T: in front of the university*-(0.5)
38. but it was all about that(.) it was about a couple who had this amazingly exciting
39. relationship but as soon as they got married:. (0.6) it was no longer exciting (0.3) this
40. was in the medieval times so they had to (.) he had to go to a monastery and she had
41. to go to a nunnery and they could WRITE these very exciting letters to each other
42. (0.9) >>↑they could be together if they wanted to be.<<(0.4) 'cos they are MARried.
43. (0.3) but (.) it's much more exciting to do it like that! ...
44. SS: ((voiced laughter))
45. 19:56 T: So that's a -
46. SS: ((voiced laughter))
47. T: that 's a classic example (.) of courtly LOVE (0.2) where you just think (0.5) °oh?.
48. (.) ha ha. (h.) (0.2) <<unusual>>°(h.) mais VOILA!
49. *but THERE YOU ARE!*

Extract 7 - Lesson 1

Extract 7, Lesson 1

1. L4: <the excessive adoration of courtly love seems: (0.5)< °may,be°:>
2. (0.6)
3. (L7): >reas (.)
4. (L 5) [reas' nable.
5. (L7) [reas' ↑nable.] °ah yeah.° =
6. (L5): =yeah↑
7. (0.1)
8. ((pen click))
9. (0.2)
10. (L4): a' right↑

Extract 8 - Lesson 1

Extract 8, Lesson 1

1. L4: k (h.) in (0.7) the opinion of the author⁴. (1.6) there: (0.4) could be::
2. (L5): /a link= /
3. L4:= /a link °between:n.↓°/ (0.3)
4. (S) ()
5. (0.3)
6. L4: /courtly love and :/
7. (0.2)
8. L5: <°/nd sexual selection/°.>(0)⁵ (h)
9. (0.8)
10. L5: ../of [Charles Darwin/.
11. L6: [‘of Charles Darwin’=
12. L4:/ > Explain this link.< /
13. (0.5)
14. L5: Are you:? -
15. L4: /do you agree/?’
16. L5: k it’s:
17. (0.3)
18. L4: NO↑?:: (0.1) °heh° ha (heh snort)
19. ((writing))
20. L4: “do not agree”↑
21. ((writing))
22. L4: (h.)

⁴ See Monson (2011) who establishes a link between Darwinian sexual selection and the practice of courtly love. Note that at the time of the writing of the Unit of Work I was not aware of Monson’s work which appeared in publication in April 2011. This lesson took place 17 May, 2011. Of importance is that students L5 and L7 agree with the proposition and argue for it, whereas L4 remains doubtful insisting that the connection is only opinion.

⁵ (0) yawn speech – sentence said while yawning

Extract 9 - Lesson 1

Extract 9, Lesson 1

1. L4: >>anyway that<< courtly [love-
2. L6: [wait] that Charles Darwin said that <what> ?
3. (1.1)
4. L4: that there's a link between courtly love (0.2) and
5. (0.3) [like
6. L5: [>no -<] ah [he said that::: he said
7. L4: [the sexual selection of your ma::te.]
8. L5: he said (0.3) no:? Char- that's what the article says
9. L6: ye:ah?.
10. L5: but Charles Darwin says that that (h.) the female take-⁶ makes the decision
11. L7: <°that's true°>
12. L6: <oh yeah↑>
13. L5 =and gets to choose (0.3) >pretty much because they have m[ore at< stake
14. L6: [()] ye,ah?
15. ((tap on desk))
16. (0.7)
17. ((knock on desk))
18. L5: [because there's]
19. L7: yeah you can say [that
20. (0.1)
21. L6: oh' ye:[ah: ↑
22. L7: [Oh they-]
23. L5: because it goes on about h[ow it's like -
24. L4: [hang on]
25. (0.2)
26. L4: in the[author's opinion there could be a link between:: courtly love (0.2)
27. L5: [() (change) ()]
28. L4: >and the na[tural selection of [Charles Dar[win<
29. L6: [yeah] [yeah] [that's] true:.'] though. (33:08)
30. I agree with that
31. (0.6)
32. L5: 'cos Charles Darwin's (0.2) °theory° °is of natural selection° [()
33. L4: [So that like-]
34. L5 °°or whatever it is°°
35. L4: so that (0.5) courtly <love:.> (0.2) <is just:: the: {err:: evolution of }(0.2) these
36. animals and that they have come [to- (2.6) °like° (.)=
37. [((pen click))]
38. L6: no-

⁶ L5 appears to be experience second language interference where she uses “take- makes a decision. The expression in French is *Prendre* (to take) *une decision*.

Extract 10 - Lesson 1

Extract 10, Lesson 1

1. L6: no wha- what Charles Darwin is saying is that{ like}(0.2) the (0.2) females have
2. like the final say. (0.4) and in courtly love that is [that is what happens:
3. (S): [>>yeah but no (0.2) he- he-<<]
4. L6: 'cos like (0.3)
5. (L5) yeah.
6. (1.3)
7. L6: the guy asks the girl (1.7)
8. (L7): [and the girl can say 'yes'
9. L6: [and the girl can say 'yes'] or 'no' =
10. L5: = {yeah}.
11. L6: so that's (.) [pretty much what Charles Darwin is saying
12. (L4) [()]
13. (0.6)
14. L5: it's a bit {cute}(h)
15. (0.6)
16. L4: just a little because the woman has 'cos the female has- (0.1) [() like
17. L5: [more] at stake
18. L4: (h.) ((sniff)) ((pen click)) keepin' the line <going.>
19. (1.0)
20. L6:> hmm.<
21. (2.0)
22. L4: {<so:.>}
23. (2.2)
24. L6: what do we write?

Extract 11 - Lesson 1

Extract 11, Lesson 1

1. L4: this author says that from resear- (0.2) that that: (0.3)<< animals>> (1.8) in
2. anim- in courtly love it's:: the woman that makes the decision and in Cha{rles
3. Darwin's research he says the woman does so obviously there is a link between
4. them} but whether that link is true- (0.8) we [don't really
5. (S): [()]
6. L4: know the facts {but y'know:..} we don't know the specif-
7. L5: I'd- I'd↑ - say it's kind of [true
8. L4: [we don't] know the specifics
9. (1.0)
10. L7: I'd say it's true that [they-
11. L6: [it- it-↑ seems true
12. L5: [like even now even] now- like=
13. L4: = >yeah but <{I don't think it's from natural selection that that's true so}-
14. L5: NO he didn't- he said (0.2) sexual selection£ =
15. L4: [=which is all {part of evolution}
16. L6: [()]
17. L5: <{yeah?}>

Extract 12 - Lesson 1

Extract 12, Lesson 1

1. L6:but then again nowadays like you get (0.1) girls always ask out guys:: too↑
2. L4: yeah. like it's different [nowadays
3. L6: [different] now:..
4. L4: so: different there are so. many times when the girl's like
5. (S) so
6. L4: (real) {obsessed↓ () with a guy and °the guy's just like°} (0.3) °((retch))°
7. (0.5) °° yea- (h). °° (0.3) °° (heh pant)(heh pant)(heh pant)°°
8. (L6) (ha) (ha) (heh pant)(heh pant)
9. L5: te- (heh pant)
10. L4: ((retch))
11. (S) (heh pant) (heh pant)

Extract 13 - Lesson 1

Extract 13, Lesson 1

23. L5: °there've been studies showing that if the female is (0.3) less attractive
 24. than the male then the relationship is less likely to work out°£
 25. (1.0)
 26. L4: >if the female is less attractive than the male?<
 27. L5: pretty sure it's that way round.=
 28. L4: yeah [yeah isn't it the male has to be (0.4) yeah that's why I don't-
 29. L6: [that's awful]
 30. (1.3)
 31. (L7) [()]
 32. L4: [Brad and Ange are]working out though.
 33. (0.2)
 34. L5: it might be the other way round actually ((laughter from other group))(0.9)
 35. °<it might be the other way round actually.>°
 36. (S) voiced laughter ((laughter from other group of students)) (4.8)
 37. L5: actually >I think it's the other way round<=
 38. L4: =that the <male > has to be better looking than the female?=
 39. L5: =yeah. (0.3) pretty sure. because £ -⁷
 40. L6: >that's what you[just said↑ <
 41. L5: [and that's]-
 42. (0.3)
 43. L4: °no:.. she said that the female°
 44. L5:>because I'm pretty sure it makes the female feel better about themselves
 45. whereas the guy can go< like - (0.7) <{don't mind going down whereas girls
 46. like ((tsk)) (h.) °{actually...}° ((tsk))⁸
 47. L7: oh that's true.=
 48. L5 =°{<actually -
 49. L7: yeah.
 50. L5 {yeah (.) you're not [good enough>}°
 51. L7 : [yeah yeah] yeah.
 52. L5: and apparently if the male's: (0.1) like worse looking they kinda feel
 53. more good looking they feel like they can always do better.
 54. (0.7)
 55. (S) hmm=
 56. (S): = Oh?!
 57. (0.5)
 58. L7: if they're better looking they kind of feel a little bit like- (0.9) they're
 59. too[()]
 60. L4: [{I suppose} that's for the shallow people.]
 61. L7: {ye[ah.]

⁷ L5 appears to be performing for the recording device.

⁸ L5's vocal fry appears authoritative

62. [((tap on the desk))]
 63. L5: no but like it's jus' - like (0.2) not necessarily (0.5) li- (0.6)
 64. L7: [it may have()]
 65. L5: [it's not necessarily a conscious thing < apparently.> like I dunno they
 66. did some studies on it like (0.6) °I dunno°
 67. L4: <then you've got the people like (0.4) <Catherine> Zeta Jones who's
 68. married to Michael Douglas who's like (0.6)
 69. L6: [oo:h. (.)]
 70. L4: [like eighty]
 71. L6: <so gro,ss:.↓>
 72. L4: but she loves him (0.2) and °{they're working ou,t.}° (0.1)
 73. L6: (ha)
 74. L4: (ha)(ha)
 75. L5:° he's like (0.3) <eighty>.

Extract 14 - Lesson 1

Extract 14, Lesson 1

1. L4: I'M JUST GONNA SAY that by this: it says that there are links
2. (0.3)
3. L7: yeah.=
4. L6:=yeah.
5. (0.5)
6. L4:{ok}
7. L5: <according to [the article↑-
8. L4: [>the author<]
9. ((sound of writing))
10. L4: it says
11. ((laughter from other group))
12. (1.5)
13. L4 in {courtly <love>}
14. L5: °{yeah}are definite° ((sound of writing)) (1.5)
15. L4: the woman wears the pants
16. (S): (ha) (heh pant) (heh pant)
17. L5: (ha) (ha) (ha)
18. ((sound of writing)) (2.3)
19. L7: links <between> courtly love and-
20. L4: makes the final decision
21. (0.8)
22. L5: Darwin's theory of se[xual selection
23. L4: [which links with]
24. (3.0)
25. ((laughter from other group)) (2.7)
26. L4: Darwin's scientific view-(3.0) of
27. (0.5)

28. L5: >sexual selection<↑£ (heh snort)=
29. L4: sexual selection
30. (1.7)
31. L7: um the woman has the final say?
32. L4: yeah
33. L5: yeah
34. L4: of sexual selection (h.) so I'd be inclined (0.4) to agree
35. { there are links}> but {whether these theories are true} (0.9) {'cos ((drops
36. pens on the desk)) they are theories }
37. (9.0)
38. L7: the woman has the final say↑?
39. L5: yeah that the woman has the final say there is more at stake for her
40. L7: yeah
41. L5: if it all goes wrong
42. ((sound of writing))((page being turned rapidly))(7.0)
43. (S) ()
44. L4: >> () here goes 'The author says in courtly love the woman makes the
45. final decision which links with Darwin's scientific theory of sexual selection
46. as the woman has more at<< (0.3) stake <so I am inclined to agree> but
47. whether the theory is true is another ((page being turned rapidly)) issue.'
48. L5: I said > ' According to this article there are definite links between
49. Darwin's theory of sexual selection that woman has the final
50. say as there is more at stake for her if all goes wrong.'<
51. (S) hmm hmm
52. L7: that's what I said
53. L4: sounds goo:↑d (.) that will do.
54. L6: do have to agree or disagree
55. L4: {well like} ((pen slapped on book)) (2.9) I've just said {'I'm inclined to
56. agree"} }
57. L5: I'll I'll copy your wee sentence (.) I like that one (.) 'I'm inclined to
58. agree'
59. (h.)
60. L4: because of what they have given us yeah
61. (0.8)
62. L5: <'based on the information we are given.'>

Extract 15

Extract 15

490. L4: ((yawn)) >ok ? alright let's start this < <podcast.> (.h) (**h**)! I think we're
491. just gonna basically have a wee chat (2.3) little conversation coming up here
492. (4.5)
493. L1: non (.) L4⁹
494. **no (.) L4**
495. L4:OK so what so what points do we want to cover here?
496. ((whispering)) ((pen clicking)) (9.3)
497. L4: we should maybe cover four points in it (0.9) because that's always ()
498. L1: °yeah°
499. (S) I' amour?
500. **love**
501. L4: So we're doing I' amour courtois
502. **courtly love**
503. (S) courtois
504. **courtly**
505. L4: I THINK we need to start with their um ah: (1.6) view of the environment
506. otherwise we can't like otherwise (0.6) courtly love won't really °make
507. sense?°...
508. L1: hmm
509. L4: so start with maybe um (1.6) ((pen click)) <French::> ¹⁰ view of nature
510. and the environment? (5.0) and we'll talk about God a bit
511. (1.1)
512. (S) sorry
513. L4: well I think we need t- because the whole thing is about courtly love
514. like everything we're doing is about courtly love isn't it? that's what he
515. just said isn't it?
516. L1: no I think everything's about um =
517. (L5) =everything's about the
518. L1: the
519. L5: [environment
520. L1: [envIRONment]

⁹ L1 pronounces L4's name in French.

¹⁰ Idea is written out first in English.

Extract 16 - Lesson 7

Extract 16, Lesson 7

1. L1: and other tragedies of life shall we do {this thing?} (.h)
2. L4: (heh)(heh)(heh)(heh)(hemm)
3. L4: well I've just said(.) humans observed nature then they learnt {the idea of courtly
4. love}
5. (1.1)
6. L1: OK! ye?ah. K that'll follow on from what I wrote >>which is ok<< ((clears
7. throat))
8. 'pour les personnes du moyen âge pendant le- le vision du monde pré-
9. moderne (0.7)
10. **for persons of the middle ages during the the pre-modern world view**
11. l'environnement était très important dans la façon de laquel ils ont vu
12. tout -
13. **the environment was very important in the way in which they saw everything**
14. (1.8)
15. L4 : <<they :>>
16. (0.3)
17. L1 : saw (.) everything
18. (0.2)
19. L4 : of -
20. L1 : °tout° and there could be like (0.1) 'les humaines a observé (1.0) hmm hmm
21. **all** **humans observed**
22. L4: la nature
23. **nature**
24. L1: yeah
25. (0.6)
26. L4: <oui ils appris l'idée de l'amour courtois>=
27. **<yes they learnt the idea of courtly love>=**
28. {yeah.}

Extract 17 - Lesson 8

Extract 17, Lesson 8

1. L1: shall we write it in here? =
2. L4 : = I'll teach you my song .
3. (0.7)
4. L1: I might write mine in here (.) I don't know where all my stuff's gone by the way
5. (0.4)
6. L4 : ♪ 'JE N'AI AUCUNE IDEE (0.4) ce (0.3) qui a fait (0.3) mais je sais *que : *♪
7. **I HAVE NO IDEA** (0.4) **what made** (0.3) **but I know**
8. ***that***♪
9. L1 : (heh pant) [*qu'est-ce que t'as?*=]
10. [***what's wrong with you***]=
11. L4 : = >>♪ la nature est vivante<< l'environnement:: chante avec passionne :♪
12. = >> ♪ **Nature is alive** << **the environment:: sings with passion**:♪
13. L1 (heh pant) (ha) (ha)
14. L4: (h.) °et les arbres aussi. [dans la brise° :♪ (.)
15. °**and the trees also in the breeze**° :♪ (.)
16. L1: [OK.]
17. L4 : ♪l'île de Cailles est dans le centre de Whakaraupo (0.4) l'endroit ou les Maori
18. a- (0.4) apprécient la beauté ♪
19. ♪**Quail Island is in the centre of Whakaraupo** (0.4) **the place where the**
20. **Maoris a-** (0.4) **appreciate the beauty** ♪
21. (0.5)
22. L1 : ok
23. L4 : >how'd'you spell << 'beauté'>> right.<
24. << **beauty**>>
25. L1: 'b' 'e' 'a' 'u' 't' 'e' =
26. L4:>>thank you< I did a 'u' (ha)(ha)(h.) ♪les animaux [a prouvé leurs valeur♪
27. ♪ **the animals [proved their values]**♪
28. L1 : [> can you () here? ()]
29. L4: (0.3) {valeurs } {()}
30. **{values }**
31. L1: ()
32. (2.0)
33. L4: < what are you doing. >=
34. L1: writing it out=
35. L4: =but it's not the final copy I might change it
36. (1.6)
37. L1: I'm gonna write the beginning

Extract 18 - Lesson 8

Extract 18, Lesson 8

a) Time: 03m 15-03m33 Duration: 0m18

1. L4: l'île aux cailles a prouvé leur valeur parce que ils ont [montré
2. L1: [°°I'm a bit] worried about
3. **Quail Island proved their value because they showed**
4. my internals because I haven't really got very many credits°°
5. (0.6)
6. L4: (h) I have twenty-two excellence credits now? (0.5) I need fourteen more to go
7. (0.8) that I- of actual credits I need to get (1.4) I only got fourteen more for internals
8. (.) that's crazy?=
9. L1: =really?

b) Time: 04:29-05m37 Duration: 01m08

- 1 the animals of- (0.9) the thing proved their worth because they SHOWNED
- 2 (1.1)
- 3 L1: >I think- OH NO< (0.5) >ei::ght< (3.1) I can get fifty-one.
- 4 (1.1)
- 5 L4: (h.) has SHOWED (0.4) la façon ->>you can get how many?<< =
- 6 **the way**
- 7 L1 fifty-one
- 8 L4: how can you get- oh 'cos you had um- (0.6) calculus
- 9 L1: no I didn't get any for that
- 10 (1.0)
- 11 L4: well how↑ can you get fifty-one? (2.4) >that do:n. make SENSE?¹¹<
- 12 L1 that's English that's bio that's chem. That's bio that's classics
- 13 L4: how many can you get from bio?
- 14 L1: ah: I can get seven in total
- 15 L4: Oh it performance you get all yours from
- 16 Yeah
- 17 L4 and lots of bio ones I suppose
- 18 L1: No I've only got seven from bio

c) Time: 06m01-06m18 Duration: 0 m18

- 1 L4: does this make sense. 'parce qu'ils ont montré la façon dont': (0.7)
- 2 **'because they showed the way in which':**
- 3 [because they show of which (0.5)]

¹¹ Said with an Southern American accent

4 L1:[in which]
5 L4: UM:
6 L1: the way in which
7 L4: the way in which we love.
8 (0.6)
9 L1: >yeah.<
10 (0.8)
11 L4:what's- what's <'to love'.>
12 (1.4)
13 L1: um:
14 L4: ADORER=
15 L1: =adorer

Extract 19 - Lesson 8

Extract 19, Lesson 8

16. (9.4)
17. L4: DONC (3.7) <vous> (2.3) <<rappellerez>> (0.6) rappelez (3.0) {err :} (0.6)
18. **SO** (3.7) <you> (2.3) <<will remember>> (0.6) remember (3.0) {err :}
(0.6)
19. remember this 'donc vous rappellerez-ce' (0.9) or does the 'ce' come before the
20. **so you will remember this this**
21. 'rappellerez' ?
22. **will remember**
23. (0.5)
24. L1 : 'ce' °before the 'rappellerez'°
25. **this**
26. L4 : does it↑? but you wouldn't- no no
27. L1: so it would be 'vous vous rappelez'
28. (1.0)
29. L4: no? it's just vous rappelez we're not doing 'vous vous'
30. L1 : isn't it 'se rappeler' ?
31. L4 : >yeah yeah<
32. L1 : (it's a) reflexive=
33. L4 : =yeah that's the reflexive part it
34. (1.3)
35. L4: I'm not doing so 'you remember' I'm {saying 'so remember'}
36. L1: oh (h)
37. (1.7)
38. L1: no I think you still need the 'vous' because it's a command °you need the
39. 'vous'° because it's a command
40. (1.1)
41. L4: well y'know when you're like (0.4) um:-
42. L1: you're not saying 'so to remember' (1.0)
43. L4: no no. I'm saying
44. L1: = you're say-
45. L4: 'remember'=
46. L1: =yeah but you're () but you're telling the audience so it's se- err
47. imperative it's a command=
48. L4: =yeah?.
49. L1: but you re[member
50. L4: [yeah?.]
51. (0.7)
52. L4: yeah
53. (0.4)
54. L1: [() vous vous
55. L4: [yeah no]
56. (0.5)
57. L4: y'know when you say 'attendez' (0.4) you don't say (0.3) 'vous attendez'
58. L1: = °yeah I know but the 'attendez' is::° (0.5) aw:. (0.5)
59. L4: y'kn[ow this is just

60. L1: [aw:]
61. (0.9)
62. L1: but then (0.3) oh yeah-
63. L4: I don't think it changes for[reflexives if its reflexives reflexives
64. L1: [OK.]
65. (1.5)
66. L4: TEACHER
67. T: hmm
68. L4: does an IMPERATIVE CHANGE if it's in REFLEXIVE (0.2) like do you
69. have to say the (0.3) 'VOUS [VOUS'
70. T: [yeah] you have to say yeah you have to say 'vous'
71. afterwards
72. (0.8)
73. L4: AFTERWARDS? (0.5) SO:.
74. L1: so like (0.6) 'rappelez-vous'='
75. L4 : =I JUST wanna say 'SO REMEMBER'
76. (0.4)
77. T: yeah (1.0) 'rappelez-vous'
78. L4: OK SO THAT'S RIGHT ok cool so you don't need to be say 'vous vous
79. rappelez'?'='
80. T: = no no
81. L1: () L4 you got it right
82. L4: {I didn't get it the right way 'round.
83. L1: °{oh, ya still got it right}°='
84. L4: ok >so so< (0.6) 'remember this': {I always forget 'this' 'cos it's
85. 'ce'}°°'remember this°°='
86. L1: um:
87. (1.2)
88. L4: ah: (4.2) 'n'oubliez jamais'? (2.3) 'and never forget' (0.8) 'oublier' is 'to
89. forget'↑ isn't it?
90. ((sound of the handling of a dictionary)) (4.9)
91. L1: yep (that's) it
92. (28.3)
93. L4: alright I've finished
94. (1.0)
95. L1: °good work°↑
96. L4: this is going at the end
97. ((pages being turned))
98. L4: ¶donc rappelez-vous ce . et n'oubliez jamais (h.) comment vous vous
99. sentez quand vous savez que :? °la nature est vivante°°¶ (2.5) >so just
100. 'remember this and never forget'='
101. L1: =so let's start from there
102. L4: HOW you felt (0.3) when you knew (0.2) oh- (0.4) you when you (0.9)
103. how you felt how- when you how- how- how you feel when you know {that
104. °nature is}-
105. (1.3)
106. L1: what d'you wanna say in the last line?
107. (0.9)
108. L4: I don't I don't really know what I wanna say {I'm still working on it}
109. L1: (heh pant) (ha) (ha)(ha)(heh pant)((ha) °*I think ()*(h.)

- | | |
|------|--|
| 110. | L4: and never (0.3) and never <u>forget</u> (2.4) {I'll just say} <que.> (2.0) la nature |
| 111. | est <u>vivante</u> . (5.0) ((sniff)) ok. (1.2) I'll write a good copy |

Extract 20 - Lesson 8

Extract 20, Lesson 8

1. ((sounds of the calls of seagulls))
2. (8.0)
3. L4: °I still don't get °°how Quail Island relates to courtly love°° (0.8) and how it
4. relates to the idea (0.5) of (1.8) the environment[tal
5. L1: [shall] we draw a
6. mind map?
7. (0.5)
8. >no how about we just talk about< (h.) °how° (1.0) back in
9. [the days they used to really care about the environment} and we went through the
10. period where we didn't (0.2) and now [we and NOW we
11. L1: [I think we should] just keep it simple=
12. L4: =yeah and we're back in the era (0.4) where we're tryin' to (0.7) um conserve
13. everything (0.3) and the restoration (0.2) the ecological restoration {at Quail Island is
14. an example of it} (0.9) and just not talk about court- (0.2) courtly love=
15. L1: =yeah. because we DON'T have ()I think skip courtly love but we CAN'T just
16. talk about every period because that's just like basically everything we've done
17. I reckon we START with (h.)(page being turned)) (1.5)
18. L4: why don't we just talk about the old view then?
19. (0.2)
20. L1: yeah I reckon ok <old view> so <<old>> (1.1) <<view>> (0.4) <<of>> (0.6)
21. <<life>> (0.9) <<{as}>> um (0.5) <<related>> (0.5) to nature (1.2) plus God (0.9)
- and
22. <then: > (0.5) today:
23. (5.0)
24. L4: hmm (0.9) I need to make up a tune it as well?

Extract 21 - Lesson 8

Extract 21, Lesson 8

1. L4: I'll put it to a French song a famous French song
2. (1.2)
3. L1: maybe a () {like}
4. L4: I don't really know=
5. L1: = do it to do it to=
6. L4: 'Tous les jours'?
7. 'Everyday'?
8. (0.7)
9. L1: ♪ >>tous les tous les touche (h.) je n'ai le - <<♪
10. L4 : ♪ L' ile :: aux [cailles ::
11. L1 : [(heh pant) (ha)] (ha)
- 12.
13. L4: ♪est dans le centre de Wha[ka,raupo : ooh le ♪
14. L1 : [(ha)(ha)] [(heh pant)] you could do it to um the
15. environment song we did=
16. L4: I dunno ♪ 'aux armes [citoyenne ↑ ♪
17. L1 : ♪ [citoyenne] ♪
18. (0.2)
19. : ((click))
20. (0.5)
21. L1 : but then you need something catchy like that
22. L4: how 'bout do (1.5) simple (0.9) ♪je n' ai aucune idée ce qui fait
23. L1 : (ha) (ha) (ha)
24. L4 : mais je [sais : que : la na[ture est vivante
25. L1 : [(heh pant) (heh pant)] [(ha) (ha)]
26. L4
27. L1: oh my GOSH DO IT to the MARseillaise

Extract 22 - Lesson 8

Extract 22, Lesson 8

1. L4: but it's how they thought that all of nature was related to <{God and they
2. studied it because they thought it helped them come to know God
3. be[tter }>
4. L1: [ok]
5. L4: and they found out the idea of like courtly love and they just sort of really
6. liked the idea of everything (1.6) that was going down (1.5) > ♪ la nature est
7. vivante °vivante° °°vivante°° la nature est vivante < ♪....and they wanted to

8. understand who God was à travers la nature parce qu' qu'ils a ils ont pense
- 9. through Nature because they thought**
10. que ♪ la nature était vivante♪ (2.7)
11. **that ♪Nature was alive♪**
12. L1: (ha)(ha) (heh pant)
13. L4: (ha)(ha) (heh pant)
14. L1: (h)
15. L4: °thankyou° singing just comes to me naturally so an accent will just naturally
16. come when I'm singing
17. L1: yeah it would
18. L4: I should just sing when I'm reading.

Extract 23 - Lesson 9

Extract 23, Lesson 9

75. L1: because: °what do they say here° (2.0)because
76. we were just thinking of leaving the courtly love {pa,rt.} (1.2) because (.) it doesn't
77. (.) particularly: =
78. L4: =we (h)-
79. L1: {well I don't particularly see how it relates to Quail Island} like 'cos I was
80. reading I was reading this thing here (0.1) no: (0.2) not this thing this thing here
81. ((grabs paper)) and it's basically saying that '...sorry Quail Island is not like
82. courtly'(1.9) love courtly love =
83. T: =hm?mm.
84. (0.6)
85. L1 : so I think just leave that and just ki[nda
86. L4: [we're just gonna talk about-
87. T: °yeah you don't need ()°
88. L4: we're gonna talk about the link between the pre-modern view-
89. L1: LIKE postmodern[n
90. L4: [ye]ah like they just really viewed Nature as a part of
91. them and they er:
92. L1: and how we're (tryin') coming back [towards that
93. L4: [and how we]'re comin'(0.3) <{yeah}>
94. towards that
95. (h.)
96. T: right=
97. L4: =AND THEN we're just talking about- (0.1) and then the <SONG .> (0.3) he↑
98. SAYS he doesn't see the <point.> but um: (0.5) ((tsk)) (0.3) the point of the
99. song(0.2) is that um: (0.3) how'd you know how much (0.3) the SONG'S ↑
100. appreciating NATURE↑ (0.4) °and stuff°- (ha)(ha) (.) (ha) (ha)↑↑(h)(h.)
101. *well*↑ (0.3) *we thought it would add to it* y'know if we did the song
102. {about the nature () and the (0.1) restoration of nature and stuff}
103. (0.7) them seeing nature and so that's why we wanted to do the song

104. (.h) (heh pant)
 105. T: oh. (heh pant)
 106. L1: she's really trying to justify *()* =
 107. T: oh yeah. °°

Extract 24 - Lesson 11

Extract 24, Lesson 11

1. L4: *je n'ai aucune idée ce qui a fait mais je sais que la nature est vivante*
2. **I have no idea what made but I know nature is alive**
3. L1 : *l'environnement*– yeah is that right ?
4. **The environment**
5. L4 : yeah !
6. L1 °° *chante avec passion*°° I thought we were doing it together
7. **sings with passion**
8. L4: keep going
9. L1: I thought we were doing it together
10. L4: oh ok
11. *l'environnement chante avec passion et les arbres aussi dans la brise*
12. **the environment sings with passion and the trees also in the breeze**
13. *l'île aux cailles est dans le centre de Whakaraupo dans l'endroit ou les Maori*
14. *appréciés la beauté*
15. **Quail island is in the centre of Lyttelton Harbour in the place where the Maori**
16. **appreciated the beauty**
17. *les animaux au île aux cailles*
18. **the animals of Quail Island**
19. *aux île aux cailles*
20. **of Quail Island**
21. *a prouvé leur valeur*
22. **have proved their worth**
23. *parce qu'ils ont montre la façon dont nous adorons*
24. **because they have shown the way in which we love**
25. *donc rappelez vous –ce*
26. **so remember this**
27. *et n'oubliez jamais que la nature est vivante*
28. **and never forget that nature is alive**
29. *que la nature est vivante*
30. **that nature is alive**
31. *que la nature est vivante*
32. **that nature is alive**

APPENDIX 9:

EXTRACTS FOR CHAPTER 6 RESULTS 2

Extract 1a - Lesson 3

Extract 1a Lesson 3

T: mais on va regarder un peu parce que on a fait un peu de recherches sur les paysages idéaux ...mais ben ...il n'y avait jamais des villes la dedans, et vous avez tous dessine les ville – [laugh] – c'est intéressant ...um...voila

but we are going to look a little because someone has done a little research on ideal landscapes....but well...there never were cities within them, and you all have drawn cities – laugh – it's interesting ...um... there you are

Extract 1b - Lesson 3

Extract 1b Lesson 3

L5: c'est simple (heh pant)

it's simple

T: c'est simple à dessiner?

it's simple to draw ?

L5: oui

yes

Extract 1c - Lesson 3

Extract 1c Lesson 3

6 :50 T: donc apparemment c'est une mémoire collectif du désert du paysage Africain

So apparently it's a collective memory of the desert of the African landscape

Qu'est-ce que vous pensez de ca?

What do you think of that?

7:04 L5: (heh snort)

L1: C'est possible

It's possible

L6: C'est possiblepeut-être

it's possible perhaps

SS : (ha) [awkward]

T: peut-etre

perhaps

SS : yeah – laugh

Extract 2 - Lesson 3

Extract 2 Lesson 3

1. T: ()le premier? (3.6)
2. **() the first?**
3. L5: ◦um◦↑ (1.8) what's plain? (heh snort) (6.30 ◦◦what's plain ?◦◦
4. (1.1)
5. L1: juste la plaine
6. **just the plain**
7. (4.8)
8. L2: () image
9. L1: ()le paysage
10. L5: ◦what !? ◦
11. L2: no. she's saying 'plain' like
12. S: like plain
13. S: I'm NOT() plaining (heh snort) (heh snort) (heh snort)
14. L5: plain (.) y'know
15. L5: (h) (h.) n- it's just { <plain↓. >}
16. SS: voiced laughter
17. (0.3)
18. L5: {not really.}

Extracts 3 to 5 - Lesson 3

Extract 3 Lesson 3

1. T: OK en générale quelles sont vos penses 24:40 vos réactions devant ces images ?
2. **OK in general what are your thoughts...your reactions in front of these images ?**
3. Donnez-moi quelques phrases. ...différents ou vous avez d'autres réactions ?
4. **Give me some phrases ...different or do you have other reactions?**
5. McCahon ?
6. L5: c'est pas intéressant
7. **It's not interesting**
8. (S) (ha) (ha)
9. (S) le dessin –

10. **the drawing**
 11. L2: oui un peu °ennuyeux°
 12. **yes a little boring**
 13. T: celui de McCahon ? c'est un peu ennuyant=
 14. **the one by McCahon ? it's a little boring**
 15. L2: =boring
 16. (L1) OH (.) NO.↓
 17. T: le paysage ou l'image
 18. **the landscape or the image**
 19. S: l'image
 20. **The image**
 21. S: l'image
 22. **The image**
 23. T: un paysage, Est-ce que vous reconnaissez un paysage comme ca en Nouvelle-Zélande ?=
 24. **a landscape do you recognise a landscape like that in New Zealand**

Extract 4a

25. L5 : = (heh pant) (.) (heh pant) (heh pant) (.) (heh pant)

Extract 4b

26. °*tout le temps.*°
 27. °***all the time.***°

Extract 4c

28. (heh pant)

Extract 4d

29. [(voiced laughter)

Extract 4e

30. SS: [(voiced laughter)]

Extract 5

31. T : PARTOUT ?
 32. **EVERWHERE?**
 33. L5 : *yeah (.) oui* (h) (h.):;
 34. **yes**
 35. T : est-ce- est-ce- est-ce est-ce que ça veut dire que les <paysages> (.) de tels paysages (1.2)
 36. **does- does- does- does- that mean that the landscapes (.) that such landscapes**
 37. sont ennuyant- ennuyeux comme vous les regardez en réalité ?
 38. **are bor- boring as you see them in reality¹**
 39. L5:° <pas toujours mais quelques fois>° oui (heh pant) (ha)(ha)=
 40. **not always but sometimes YES**
 41. SS : = (voiced and unvoiced laughter)
 42. (1.2)
 43. T :> D'ACCORD. ! < (1.3)
 44.

¹ It appears clear that L5 meant to say the boring landscapes as depicted by McCahon are everywhere. The teacher's question may not be a clarification but a challenge – more the effect of “Are you sure you want to say that?”

Extract 6 - Lesson 3

Extract 6, Lesson 3

1. T: et :. um est-ce que vous avez ce- celle-là ?
2. **and :um do you have this one?**
3. L2 : >oui<
4. **Yes**
5. L6 : oui
6. **yes**
7. S : oui
8. **yes**
9. L5 : <<oui ?>>
10. **<<yes?>>**
11. (2.4)
12. L5 : moi j'[aime bien
13. **I really like it**
14. T : [ça c'est 'Waves Coast <Clou:d>'
15. **[that's**
16. L5 : moi j'aime bien
17. **I really like it**
18. S : hmm hmm
19. L5 : parce que c'est [(calme) il y a les montagne (.) l'eau (.) le ciel bleu
20. **because it [(calm) there are mountains (.) water (.) the blue sky**
21. S : [()]
22. L1 : un peu comme (.) *Banks Peninsula*=
23. **a little like**
24. L5 : = >oui ! ◦<
25. **= >yes ! ◦<**
26. T : ça te fait penser à The Bay.↓ et les (collines)=
27. **it makes you think of The Bay and the hills**
28. L6 : =c'est comme New Zealand
29. **it's like New Zealand**
30. L3 : they all are=
31. S : ()
32. L6 : oh ! are they ?
33. L2 : yeah ! they're all *New Zealand artists!* (ha) (ha) (ha)
34. SS: voiced laughter

Extract 7 - Lesson 3

Extract 7, Lesson 3

1. T: et en gros le pub prétend que la Nouvelle-Zélande est :.(0.6)
2. **and overall the ad claims that New Zealand is:.**
3. L5 : *over :t.°* (h) (.)=
4. *gree :n.°*
5. L2 := (ha)
6. S : et :
7. **and**
8. L6 : jolie=
9. **pretty**
10. T : =_jolie : (.) vert (.) pure
11. **pretty green pure**
12. S : ()
13. S : ()
14. (0.9)
15. Est-ce que vous êtes d'accord avec cette ima- cette image de la Nouvelle- Zélande ? 34 :17
16. **do you agree with this ima- this image of New Zealand ?**
17. ((pen click))
18. (0.6)
19. L5 : je pense (0.7) on a peut être tout ça mais (aussi) c'est :: er : (0.6) °un peu° (0.6)
20. *différent*² (h) (h.)
21. **I think a we have all that but (also) it's:: er (0.6) a little (0.6)**
different(h) (h.)
22. L2: oui
23. **Yes**
24. T: parce que ça existe tous [ces pay[sages ça [existe
25. **because that exists all these landscapes that exists**
26. L5 : [ou.i :?]
27. S : [oui]=
28. S : =oui
29. L1 :: mais pas partout³ 34:31
30. **not everywhere**
31. (0.9)
32. T : °>mais pas partout<°
33. **but, not everywhere**
34. **(2.4)**
35. T: {et ::} (0.5) il y a une réalité quand même=
{and::} there is a reality all the same
36. L5: = °*oh!- * yeah.° =
37. (L3)=° non.° =
38. **No**
39. (0.8)
40. T: = non↑ ?
41. **no↑?**
42. L3: pas ! (2.3) well like (1.6) c'est (1.8) pas (0.3) comme (0.5) ma vie↑
it's not like my life
43. 34:36 T: >>ça c'est pas dans ta vie mais il y a une réalité<< OK !
that it's not in your life but there is a reality

² Unvoiced laugh speech.

³ L1 incorrectly pronounced last syllable of *partout* (everywhere) as 'u', and the teacher corrected her.

Extracts 8a to 8c - Lesson 3

Extract 8a, Lesson 3

44. T: ok comment en fait est-ce que la Nouvelle-Zélande est vue par les européens ?

45. Ok how in fact is New Zealand seen by the Europeans?

46. donc on va regarder l'entretien avec John Key qui a été à Londres pour le mariage royal

47. so we are going to watch the interview with John Key who was in London for the royal wedding

48. et qui a été interviewé par Stephen Sackur de la BBC.

49. and who was interviewed by Stephen Sackur of the BBC

50. L1: OH! I've seen° this° !⁴

51. L2: doesn't it have something to do with(() oh. no maybe I haven't

52. L1: [<this is awkward >]

Extract 8b

BBC Hardtalk–John Key est interviewé par Stephen Sackur - Transcription

Stephen Sackur: One of the country's unique selling points, and your advertising slogan was all about this, was "100% Pure New Zealand", the idea that you're a greener nation than any other in the developed world – that already isn't true, as your population does slowly rise, and it's going to get worse. Dr Mike Joy, of Massey University, a leading environmental scientist in your country, said just the other day, "We are delusional about how clean and green we are."

John Key: Well that might be Mike Joy's view, but I don't share that view.

Sackur: But he is very well qualified, isn't he? He's looked, for example, at the number of species threatened with extinction in New Zealand, he's looked at the fact that half your lakes, 90% of your lowland rivers, are now classed as polluted.

Key: Look, I'd hate to get into a flaming row with one of our academics, but he's offering his view. I think any person that goes down to New Zealand ...

Sackur:: Yeah but he's a scientist, it's based on research, it's not an opinion he's plucked from the air.

Key: He's one academic, and like lawyers, I can provide you with another one that will give you a counterview. Anybody who goes down to New Zealand and looks at our environmental credentials, and looks at New Zealand, then I think for the most part, in comparison with the rest of the world, we are 100% pure – in other words, our air quality is very high, our water quality is very high.

Sackur: But 100% is 100%, and clearly you're not 100% ... Look whether you agree with Mike Joy's figures or not, you've clearly got problems of river pollution, you've clearly got problems with species which are declining, threatened with extinction, and if he says the problem is, he's not just blaming you, the problem is that central government in New Zealand has been complacent about this so what are you going to do about it?

Extract 8c

39:55

53. T: OK↑.

54. L1: c'est 'awkward'

55. it's

56. (L2): it's a bit awkward=

57. (L7): =awkward

58. L3: how do you say 'awkward' °in French.°

59. S: (heh)(heh) (pant)

⁴ L1 is following in French and reacting to the news of the up and coming interview.

60. (1.2)
61. T: un peu gênant. =
- 62. a little awkward**
63. S: =gênant=
64. **awkward**
65. S: =gênant
66. **awkward**
67. T: est-ce que (0.2) ben qu'est-ce que vous pensez (de tout ça)
- 68. do (0.2) well what do you think (about all that)**
69. L5: he kinda has a point
70. T: le journaliste ?
- 71. the journalist ?**
72. (L5): oui =
- 73. yes**
74. T: =oui il a raison parce qu'ils sont les statistiques
- 75. yes he's right because they are statistics**
76. S: oui
- 77. yes**
78. L1: le journaliste (.)a(.) { attaqué :.} c'était un peu (.) 'harsh :' =
- 79. the journalist attacked it was a little 'harsh'**
80. S : =oui
- 81. yes**
82. L3: il (.) est(.) comme (.) les républicains
- 83. he is like the republicans**
84. S : ()
85. L3: deny ? .deny ?...la réalité
- 86. reality**
87. (3.1)
88. T: oui c'est vrai parce que c'est vrai on n'est pas <<100% pure>>
- 89. yes it's true because it's true we aren't <<100% pure>>**
90. S: oui
91. L5 * mais (heh pant)(h.) (heh pant) (h.) quatre-vingt (ha) c'est pas (ha) (h.)* =
- 92. but eighty is not**
93. L6: it's purer than (0.7)comme
- 94. than**
95. S: des autre pays =
- 96. some other countries**
97. T: =des autres pays
- 98. some other countries**
99. L1: toutes les slogans (1.0) publicités sont un peu =
- 100. all the slogans are a little**
101. L2: = exagérées
- 102. exaggerated**
103. T: les deux ont raison
- 104. both are right**
105. L5: quatre-vingts c'est pas *«woo vient en Nouvelle-Zélande!! »*
106. (voiced laughter)
- 107. eighty is not * " woo come to New Zealand!!"***
108. L2 : cent pourcent c'est mieux !
- 109. hundred percent is better**
110. L5: d'accord (voiced laughter)
- 111. ok**
112. L2 : it's like eighty percent pure
113. L5: yeah eighty percent pure come here!

Extract 9 - Lesson 3

Extract 9, Lesson 3

49:35

1. T: juste pour résumer un peu, qu'est-ce que vous pensez est l'idée la plus important à présenter aux français ?
2. **just to summarise a little what do you think is the most important idea to present to the French?**
3. L5:49 :52 : on n'est pas vert. La Nouvelle-Zelande n'est pas vert
a. we aren't green New Zealand is not green
4. S : snigger
5. L5: on n'est pas vert
6. **we aren't green**
7. T: un commence...d'accord. ca c'est la chose la plus important.donc pour présenter quelque chose
8. **A beginning ok that's the most important thing so to present something**
9. aux français tu commencerais (50 :05) avec « La Nouvelle-Zélande n'est pas verte » ?
10. **to the French you would start with "New Zealand is not green"?**
11. L5:um -
12. T: C'EST QUOI PARMIS CES IDEES laquelle est l'idée la plus importante ?
13. **what is amongst these ideas, which idea is the most important?**
50 :15

Extract 10a - Lesson 9

Extract 10a, Lesson 9

1. T:...it feels a wee bit-
2. L5: >yeah<
3. (1.3)
4. L5: just a wee bit full of (it) (ha)(heh snort)
5. T: °yeah? well.° well I was- =
6. L5: =but not quite but 'yeah'

Extract 10b - Lesson 9

Extract 10b, Lesson 9

189. L5: * “we should be saving the world not destroying it” * (°) ⁵ that can be our last
190. line
191. (.) *on devrait* (.) save
192. L2: >*sauver*<=
193. L5: =(taps pen on book)) *la planète pas détruire ça!* (°) (ha) (ha) °°
194. L2:= (heh) (snort) <insulting>. 15m44
195. (3.6) [absolute silence in the class]
196. L5: OI! (ha) (ha) (2.1) (ha)(heh)(.h) >(heh) (heh) (heh) (heh)<
197. L2: °° (I don’t want to do it) °°
198. L5: >(heh) (heh) (heh) (heh)< (5.3) (yawn) (LS)

Extract 10c - Lesson 10

Extract 10c, Lesson 10

1. T: ((clears throat)) <today I’d like you to get through:- (1.1) °quite a lot more°-(0.4) >(heh
2. pant) (heh pant) (heh pant) (heh pant)< so that you can be doing () finishing () tomorrow.
3. maybe practising it as well () as you were just saying
4. (L4) yeah
5. T: do you feel:? better- in a better position
6. (1.1)
7. (L4) uh. hmm? (6m01)
8. (L2) >nah.<=
9. =T: (heh pant)
10. (0.4)
11. (S) *oui*
12. (0.5)
13. (S) *oui* =
14. (L5): =°°yes::°°
15. ((strong group voiced laughter))

⁵ Making a mistake of beauty – see Scarry (1998) in Chapter 4.

Extracts 11a & 11b - Lesson 10

Extract 11a

339. L5 : forests are replaced with cows or:
340. (L4): (heh snort)
341. (L1): °(ha)°⁶
342. (0.6)
343. L5; replaced with like cows or farming
344. L4: oh.
345. L5: or crops
346. L2: crops don't have that much (effect)

Extract 11b

418. L5: which increases carbon emissions
419. L2: it doesn't increase carbon emission does it
420. L5: cows' far:t.
421. L2: that's not carbon is it
422. L5: () whatever

⁶ L1 and L4 laugh at L5's comment; this could be interpreted as chastisement for previous ridicule as L5's statement was not intended as funny, though in the context it was a little absurd.

Extract 12a - Lesson 11

Extract 12a, Lesson 11

614. L5: we think we're clean green but really these things ((thumps the desk))are actually
615. destroying our (.).° uni(.).verse!° ((said with mock sobbing))⁷ (0.8) (heh pant) (heh pant) (heh
616. pant) (heh pant)
617. L2: *stop being too:(0.2)OVER DRAMATIC* [(ha) (ha) (ha) (ha)
618. L5: [(ha) (ha) (ha) (ha)

Extract 12b

881. L4: what are we laughing at?
882. L5: *well it was like how we're saying we think we're clean and green and it's not the
883. truth* (breaks into laughter)
884. L2: (laughing fit)
885. L4: *we'd be what? *
886. L5: it should be like we are dirty and °brown°?⁸↑↑ (breaks into laughter)
887. L2: *dirty and brown* (breaks down into uncontrollable laughter)
888. L4: we thought you were laughing at the fact that () had a button undone⁹
889. L2/L5((laughter))

Extract 13 - Lesson 12 (Podcast)

Extract 13, Lesson 12 (Podcast)

1. L5 : à ce moment la Nouvelle –Zélande n'est pas l'endroit propre est vert que nous croyons être
2. **At the moment New Zealand is not the clean and green place that we believe to be**
3. mais peut être avec les projets comme l'île aux Cailles il peut être un pays où nous pouvons
4. **but perhaps with projects like Quail Island it can be a country where we can**
5. être fier.
6. **be proud.**

⁷ This is another example of L5's use of irony in relation to the environmental theme. Note that she is given feedback by L2 who jokes but draws her back on track. It is possible that L5 is not engaged in the message but may be doing simply what is required of her.

⁸ L5: cannot control her laughter and can barely get her phrase 'dirty and brown' out before breaking down into uncontrollable laughter.

⁹ This is an example that shows that L4 and the group L2 and L5 are at cross purposes. In this instance there is class simultaneous laughter but at very different things. L2 and L5 have a laughing fit over the phrase "dirty and brown" to describe the reality of the New Zealand environment instead of "clean and green", L4 believes they are laughing with L1 and L3 at her comment that L1 has a button undone. Neither finds the cause of each other's laughter sufficient to warrant laughter creating an ambiance of subtle discord and inauthenticity (see lines in this lesson for other examples of questioning the laughter of others).

Extracts 4e (i) and 4e (ii) - Lesson 8

Extract 4e (i), Lesson 8

L7: start

1. L3
2. c'est vrai que la Nouvelle-Zélande a quelques belles plages, forêts
3. et montagnes mais la description de la Nouvelle-Zélande comme 'one hundred percent' pur
4. est définitivement fausse.
5. ***it is true that New Zealand has some beautiful beaches, forests and mountains but the***
6. ***description of new Zealand as one hundred percent pure is definitively false.***

Extract 4e (ii)

7. Un autre exemple de notre présentation représentation idéaliste est l'art typique de la
8. Nouvelle-Zélande qui présente un paysage pur c'est que ce que nous voulons voir n'est pas
9. la réalité c'est comme si nous effaçons les bâtiments et la pollution pour faire semblant que
10. nous ne sommes pas la et présent l'image originel de la Nouvelle -Zélande nous garde l'idée
11. du monde pré moderne mais nous ne occupons pas de l'avenir.
12. ***Another example of our idealistic representation is the typical art of New Zealand that***
13. ***presents a pure countryside. The problem is that what we want to see is not the reality. It***
14. ***is as if we erase the buildings and the pollution to give the impression that we are not***
15. ***there but we don't take care of the future.***