Yarning Country into Classroom: Mobilising Aboriginal Traditional Knowledge through Collegial Yarning to co-create cross-cultural secondary science curriculum content

Theodore Watson Read
(Bachelor of Science Education, Bachelor of Educational Studies, Graduate Diploma in Outdoor Education, Master of Educational Studies)

A thesis submitted for the degree of Doctor of Philosophy at
Monash University in 2021
Faculty of Education

Copyright notice

Declaration

I declare that this thesis is an original work of my research and contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

Theo Read

Date: 14 April 2022

Acknowledgements

I have engaged the services of a professional editor/proofreader, Ben Morgan. Ben has advised me that his undergraduate majors were sociology and political science.

I would like to make it perfectly clear to the examiners that the editor's advice to me has never extended beyond guidance on English expression, and in no way has affected the substance and structure of this thesis.

My PhD supervisors. I thank you all for your guidance, and the generosity of your expertise. Professor Zane Diamond, Dr Linda Henderson, Associate Professor Shane Phillipson, and Dr Jennifer Rennie. I have been privileged and honoured to have shared this journey with such a compassionate, inspirational and caring group. Thank you all. I specifically acknowledge the enduring support of one of my supervisors. Zane, thank you so much for your guidance, time and passion that provided such wonderful support for me as I negotiated what at times was a challenging journey. Your instinct and insight kept me on track during the most difficult stages. You are a treasure!

I acknowledge the encouragement and support to begin this PhD journey from Dr Michael Michie and Daryl Rose, both of whom were members of my original Kormilda Science Project team. Their ongoing moral support and belief in my research was comforting and reassuring.

I would also like to express my gratitude for the help I received from the particular Indigenous experts who were my collaborators during the early stage of this journey, with special thanks going to the following Traditional Owners and Aboriginal Elders from the

> *Top End Community: Aunty Penny, Hetty and Jack.*
>
> *Centre Community: Bobby, Lex, and Jeannie.*
>
> *Southern Community: Aunties Lily, Polly and Irene, Uncles Tommy, Jimmy and Darcy. Although I have used pseudonyms for the people, they and their families know who they are.*

My deepest gratitude goes to my immediate family who shared this journey with me, through difficult 'lockdown' times, maintaining their interest, support, and belief in what I was doing.

And finally, my wonderful, loving parents, now long gone. Their most valuable gift to me was a strong and active belief in addressing social justice issues.

Table of Contents

Abstract

This study is based on a co-created cross-cultural book research project in secondary Science Education between myself and Indigenous expert knowledge holders from three Aboriginal Countries, and examines the role of professional and other conversation styles in mobilising Aboriginal knowledge from Country into the western science classroom. The book project produced secondary textbooks for each Country that presented knowledge within a bi-cultural local context to the students and provided an understanding of elements of both the Aboriginal and the Western Scientific worldviews for teachers and students alike.

This PhD research sought to understand how a non-Aboriginal Australian secondary science teacher (the author) worked respectfully with Aboriginal experts of Country to produce new knowledge that could become shared, co-created knowledge. The need to examine the whole process of shared knowledge development became the focus, and so the research question guiding this study became 'What has been the role of professional conversations in the mobilisation of Aboriginal knowledge from Country to Classroom?'

In a very real sense, this PhD study has served as a reflection on the book project both for me and for the original participants and their families and communities. It has also aimed to provide others working in the field of culturally co-created curriculum development with further insight and clarity about the role and importance of professional conversations, identified in this thesis as 'Collegial Yarning', and hopefully provides a degree of encouragement for Aboriginal and non-Aboriginal experts to take on the challenge of developing cross-cultural curriculum content in Science for the Australian secondary schooling sector.

My literature review of the relevant fields of social science and education research revealed the dearth of co-created, cross-cultural science curricula and its processes of

development across the world. One noticeable exception is the work presented by Aikenhead and Michell (2011) in Canada, but sadly, the response by the relevant educational system to his work was similar to that evidenced by the overly cautious and suspicious reactions to my published work. It would seem that such educational curriculum material is still well ahead of its time.

The chosen methodology is auto ethnographical, hybridising both analytical and evocative forms. It is my contention that, given the complexity and richness of the original book project, both forms of autoethnography are required simply to extract and reveal what the data, in all its forms, has to offer for those that take up the challenge to develop their communication skills in Collegial Yarning and to thereby further the work in the field of secondary Science Education.

The evocative form uses the rich narrative style to capture and present the scenarios and vignettes all of which paint a picture of a representative cross-section of the social interactions that transpired in each of the three Communities during the course of the project. The analytical form adopts the thematic analysis inductive method version (Braun & Clarke, 2008) because of its inherent theoretical freedom. A coding technique is utilised to explore for and identify the patterns within the data. I made this decision in light of the scarcity of similar research elsewhere in co-created cross-cultural curriculum development in Science Education.

The need to validate the accuracy of the findings for this study has been realised through the strategies of member checking, triangulation and external auditing. (Creswell, 2012).

In a study of this nature, there is a compelling need to address the vitally important dual issues of confidentiality and ethics (Bainbridge et al., 2013). The process is informed

and guided by the NHMRC (2018) resource document and the AIATSIS Code of Ethics (2020), both of which provided a framework for the research. Understanding just how to translate ethics theory into practice in the field of cross-cultural research in the Australian Indigenous world is impossible without the guidance of Aboriginal people and this thesis attests to the importance of this aspect throughout the study. I also sought guidance through reference to work by authors such as White and Fitzgerald (2010) and others. I found that informing my work, within the cultural settings of each community, in terms of the contemporary third space was useful. My own work reveals that when researching in the contact zone (Pratt, 1991), the rules of engagement, evidence and validation need to be negotiated.

Acknowledgement of Country

I would like to acknowledge the Kunwinjku, Pintupi, and Gunditjmara lands because it was their people, and particularly their Elders, past present and emerging who were so committed to the original Earth Science Book fieldwork that backgrounds this study. They were so patient, accepting and supportive of me during that long time, and indeed have remained so for this current study. I thank them for their collective friendship and for welcoming me into their families, and for sharing with me that most precious part of Australia's true identity, her Aboriginal Traditional Knowledge and Culture.

List of Tables

List of Figures

Glossary

Aboriginal: For this study the term refers to an Aboriginal Australian person, who is of Aboriginal descent, identifies as Aboriginal and is accepted by their Aboriginal community as such.

Aboriginal Elder: The term refers to someone who has gained recognition as a custodian of knowledge and lore, and who has permission from their Community to disclose knowledge and beliefs. In southern regions of Australia, they may be referred to as Aunty or Uncle.

Bininj: The term refers to an Aboriginal person, used in Arnhemland region of Australia.

Balanda: Refers to a non-Aboriginal person, used in Arnhemland region of Australia.

Black: For the purposes of this study, this term refers to Aboriginal Australians.

Community: The capital 'C' is used for an Aboriginal Community where groups of Aboriginal people with kinship associations are living in Country.

Country: Refers to an Indigenous Australian person's traditional lands.

Gubbah: An Aboriginal English term referring to a non-Aboriginal person, used in southern areas of Australia.

Humbugging: An Aboriginal English term referring to making unreasonable demands from family or behaving in a disrespectful manner.

In/On Country: This term refers to an Australian Aboriginal person who is on their ancestral Country. This gives that person the right to talk about cultural issues.

Indigenous: For the purposes of this study the term 'Indigenous' refers to a person of Aboriginal or Torres Strait Islander descent, and when used in an international context, the term refers to a Country's 'First Nation' people.

Koorie: The term 'Koorie' refers to Aboriginal Australians living in Victoria.

LAECG: The Local Aboriginal Education Consultative Group whose members are from the local Aboriginal community and have an interest and commitment to Koorie education.

Moiety: This term refers to the first level of an Aboriginal person's kinship and can be determined by their mother's side (matrilineal) or their father's side (patrilineal).

Non-Aboriginal Australian: Any person living in Australia who is not of Aboriginal descent.

Traditional Owner (TO): The term given to Aboriginal people who have ongoing traditional and cultural ownership rights and connections to Country.

Two-Way Science: A pedagogical concept connecting the traditional ecological knowledge of Aboriginal people with Western science inquiry, and links that to the Australian Curriculum in a learning program.

Western Science: For the purposes of this study, the term refers to the science content taught in Australian schools as per the Australian Curriculum Guidelines. It is text based and quantitative, objective, and categorised.

Western perspective: A term that is used very broadly to refer to the broader Australian social norms, ethical values, traditional customs, belief systems, political systems, and science and technologies that have some origin or association with Europe.

White: For the purposes of this study this term refers to non-Aboriginal Australians, 'white' people, 'white' children.

1. Chapter One – Introduction

1.1 Introduction

I will commence this study of my journey by sharing a personal fact – this study represents a significant emotional investment, where my focus has been as much on my emotions, my thoughts and feelings as it was on the more objective, structured academic aspects of the study. This profile duality reflects my choice to adopt an overarching autoethnographic paradigm, primarily to trace and detail my long journey of self-discovery and sustained learning from 1992 to 2001. It is my sincere hope that the study's outcomes will help us, as educators, over time to collectively grow and sustain our emotional well-being in the pursuit of cross-cultural curriculum development between Aboriginal and non-Aboriginal Australians.

This study is based on the professional conversations between Aboriginal and non-Aboriginal Australians contributing to the mobilisation of Aboriginal Traditional Knowledge from Country to Classroom, which became my primary research question over time. This thesis presents an analysis of my social engagement and subsequent verbal face-to-face conversations, conducted over the ten-year period, with Aboriginal people from three diverse Aboriginal Communities. It was these people who provided me with the friendship, Traditional Knowledge and guidance required for the production of a two-way Earth Science textbook. During my visits to the Communities, my status gradually shifted from outsider to insider, as my relationships grew with the principal members and families associated with the bookwork. Things were not done quickly, because I soon learnt that when working with Aboriginal people, particularly in traditional settings, you work in Aboriginal time, which in effect often translates into improved quality of work, and of accompanying relationships you build with the people – all seen as being more important than the work quantity.

In terms of methodological sequencing, my study analyses my field notes and diary entries from stages of the book project upon which this study is based, the *Kormilda Science Project* – as it was then known. This was developed around an Aboriginal Community and Country context. For the book project research, an Aboriginal cultural framework was built around carefully selected specific items of Traditional Knowledge that had been collected directly from the Traditional Owners and Aboriginal Elders. These items provide the students with an introduction to the Aboriginal worldview, and a welcoming to that Aboriginal Country, knowing that each piece of culture came from an identifiable Aboriginal person. This Worldview was then accompanied by a Western Science worldview through the integration of appropriate parcels of science and maths related knowledge. One worldview accompanying the other, with the aim of encouraging the student reader to see the wonderful country, Australia, from two perspectives: Aboriginal and Western.

1.2 Aims of the Study

The primary aim for this study is, by answering the main research question, to describe my experiences while working alongside my Aboriginal participants and examine how by conversing I learnt the cultural conventions and protocols that better prepared me for working with them to co-create new ways of knowing and teaching, broadly described here as professional knowledge. My personal growth in undergoing this process may subsequently provide both guidance and encouragement for other non-Aboriginal educational researchers and particularly science teachers, to develop bicultural teaching materials that are compatible with the mainstream secondary science curricula, and which provide a bridge between the Aboriginal worldview and the Western Science worldview. A subsidiary aim is to provide a reconciliatory platform for promoting a better understanding and appreciation of Aboriginal Australia.

1.3 Research Question and Subsidiary Questions

The main research question for this study is: 'How did professional conversations contribute to the mobilisation of Aboriginal knowledge from Country to Classroom?' For the past two decades or more I have been urged by some of those closely involved with the original research to write a story underlying the nature and dynamics of the fieldwork in the Aboriginal Communities behind the Kormilda Science Project. This study accedes to their wishes and completes a further stage of unfinished business. This study consequently examines my participation with three Aboriginal communities, and how I engaged with them, in the pursuit and collection of their knowledge of Country that we then co-created into Earth science knowledge that could be used in a Western classroom.

Importantly, backgrounding this study was the essential, subtle, but ever-present and powerful influence of the Aboriginal Community on my induction and enculturation. This was a necessary and evolving process, where along my journey of learning my Aboriginal teachers taught me how to better engage with them while working alongside them, sharing in their cultural knowledge. The research and development of the culturally inclusive secondary Earth Science textbook was manifested through this collaboration and co-operation.

I should explain to the reader that the term 'classroom' in the main heading and research question is a metaphor, a symbol, for the science book that was being developed for the classroom. At the start of this research study, I had intended to include the book's school trial phase, but quickly decided not to. I simply had to draw the line on what was achievable.

The central research question will be addressed through the exploration of the following sub-questions. Sub-question 1 demonstrates the relevance and importance of weaving together the concepts of Community, Country and Aboriginal ways of knowing to the overall enablement and development of the original project. A process achieved through a

multi-conversational dynamic of knowledge mobilisation, resulting in the co-creation of new cross-cultural knowledge.

1. ‘What were the key talking types that took place to inform the mobilisation?’

   Sub-questions 2, 3 and 4 demonstrate the dynamics of the operational frameworks behind the interpersonal relationships and probe my level of collective acceptance by and attachment to the Aboriginal people.

2. ‘Who were the key players involved in the interpersonal verbal communications?’

3. ‘How did the interpersonal verbal communications that took place relate to the different ways of speaking, to location, relationality and positionality?’

4. ‘What were the enablers and restrainers that influenced the collaborative process, and how did they impact the work?’

5. ‘Is there any similarity between key aspects of the fieldwork among the three communities?’

6. ‘What were the lessons learnt during the mobilisation?’

   Sub-questions 5 and 6 form the basis for a summative investigative thrust for this research.

On one final note to this section: to derive the optimal aspects, I explored the above sub-questions by using an autoethnographic methodology and method. The initial decision on methodology proved problematic, a choice between ethnography and autoethnography, but as Hayano (1979, p. 99) points out, ‘In many ways, the problems of autoethnography are the problems of ethnography compounded by the researcher’s involvement and intimacy with his subjects. In either case, critical issues of observation, epistemology, and ‘objective’ scientific

research procedures are raised'. An interesting statement which concisely explains my choice for the methodology, because being an ethnographer simply would not cut the mustard in telling this story. Problem solved. I discuss the findings derived through exploring these sub-questions in Chapter Five, sections 5.5 and 5.6.

1.4 Contribution to Scholarship

A detailed empirical analytic autoethnographic study, comprising qualitative components, was conducted to obtain data to answer the main research question and the six key sub-questions. In addition to the thematic analysis, an overarching evocative autoethnography was used to provide a rich reflection that captured the emotions and atmosphere that pervaded the original project's journey. The outcomes have led to an original contribution in the form of analyses of the importance of conversations as a pedagogy and as a means of providing an evidenced base for future ongoing research processes in this area of cross-cultural knowledge production in Science Education.

I believe that this research makes a substantial and original contribution to scholarship generally in the area of both-ways or two-ways education (Wunungmurra, 1988), and more importantly, specifically to the sciences and social sciences as determined by the Australian Curriculum (2015). It expounds perspectives pertaining to collaborative work practices in Aboriginal communities, how the concept of 'Country' may be presented and applied as a dual worldview in an integrated secondary science textbook, and how the concepts of mobilisation, contact zone (Pratt, 1991) and border-crossings (Aikenhead, 1997) may be used collectively to actualise reconciliation in this area. Although there is substantial literature in the area of two-way education, contact zone, and the recognition of Indigenous Knowledge as Science, there is very little evidence of research into the actual Community-based mechanics behind developing Indigenous inclusive science curricula seeking to provide an Indigenous

worldview alongside its Western science counterpart. There appears to be little research available on how non-Indigenous professionals such as teachers develop the professional conversational skills and intercultural sensitivity to authentically co-create knowledge that can be brought into the Australian curriculum. My '*enculturation*' process was vital to developing attachment and trust between me and Aboriginal expert knowledge holders. I suggest that these processes were the necessary precursors to co-creating two-way science curricula, where Indigenous knowledge systems form part of a science curriculum and associated concepts such as 'Country', and 'reconciliation', in any educational system are realised.

Finally, this study has critiqued and advanced existing theoretical frameworks for reconciliation pedagogy – a relatively new field of inquiry in educational research. My own original book research work appears to support what Ma Rhea et al. (2012) found from their research, which Ma Rhea (2015, p. 89) cites when stating that

> the most encouraging examples of a fractal disruption at the level of community are where the local Indigenous community, the Local Aboriginal Education Consultative group (LAECG), together with Indigenous families who are both local and from other places, work with local schools to develop Reconciliation Action Plans (RAPS). It appears that the processes of both encouragement and empowerment and enablement have opportunity here.

1.5 Context for the Study

1.5.1 Inception

As previously mentioned in the introduction, this study is framed by the Kormilda Science Project, which evolved from my teaching at Kormilda College, Darwin, in 1992. My

teaching allotment included a year nine general science class of 24 Aboriginal students, for the majority of whom Standard English was not their first language. The majority of these students came from traditional communities spread throughout the N.T., and they were my very first contact with Aboriginal Australians.

I witnessed from my initial teaching, two intimately interrelated, but contrasting aspects. On the one hand, the students' scholastic ability, natural curiosity and desire to learn science, and on the other, the cultural gap between their knowledge of their Country and their Eurocentric Western Science subject. Almost immediately I recognised the enormous inconsistency with who these students were and represented, and their science course and textbook.

The catalyst for a radically new concept of science textbook occurred on my first visit to the Top-End Community, in April 1992. The Aboriginality of the Community plus the visual impact of the Arnhem escarpment and adjacent floodplains that surround the Community were an epiphany, a deep awakening to the possibilities for two-way science education. This compelling and exciting realisation was quite startling with what lay in front of me: a wonderful merger of rich Aboriginal culture and standout Earth Science exemplified.

The original book research work embraced three Communities: the Top-End, the Centre and the Southern, and the original fieldwork was completed in each Community, within Aboriginal social settings where the notion of reciprocity was first and foremost. My Aboriginal participants gifted me their time, friendship, patience and traditional ways of knowing while helping and supporting me. My gift in return was to produce an Earth Science textbook for them and particularly their children. They also knew the book would belong to them and that any royalties from sales would flow back to their Community.

1.5.2 Researcher's Background

I am a fifth generation Australian, of middle class, Celtic-Anglo-Saxon background. From an early age I was always inquisitive about my surroundings and tended to ask too many questions. My 'What's dat?' was often answered with 'A whim wham from a goose's bridle'. From my earliest memory I have held a profound and passionate interest in the Australian outdoors and its conservation. My formative years were well grounded in perceptions of equality and social justice towards others. My sole career has been teaching, as a state secondary science teacher. It is also fair to say that in relation to the original book project, I was acutely aware of my lack of background experience, acknowledging that my skills and knowledge were seriously inadequate for the task that lay ahead. I see this study simply as an extension of the bookwork, endeavouring to do what I have always attempted to do, my absolute best for our children.

1.5.3 The Support Network

I realised early in the journey that I had to identify people who had the essential expertise. Consequently, I soon engaged with a small number of people, both Aboriginal and non-Aboriginal, who had the necessary skills and knowledge that I could tap into. Their roles were multifarious, interspersed between that of mentor, cajoler and critic. Their encouragement and wise counsel continued for the duration of the Project, and without them the project would never have got off the ground.

During the subsequent ten-year development period, this initial, small guiding group of supporters had grown into a wonderfully supportive network of more than 70 people, each individual volunteering their own skills and knowledge, specific to their personal area of expertise. It was with their assistance that I eventually produced three stand-alone science

textbooks, each one providing a two-way look at a specific Aboriginal Country, and presenting a two-way – Aboriginal and Earth Science – perspective.

1.5.4 The Participants and Voice – an Introduction

During this study's story I will often refer to my engagement with the Aboriginal people in each Community. I will refer to them variously as participants, team members, friends, extended family members, colleagues and indeed, as gardeners. These were the people who took the book project journey with me from 1992 to 2001. And by default, they have become my tongue-in-cheek co-conspirators for this study, because they were the ones who I engaged and conversed with while we plotted together to get the job done. In Chapter Four and beyond, I will be referring to these people as members of my core and ancillary groups, in terms of their contribution to the original bookwork. From the Top-End Community I will talk about Jack, Aunty Penny, Hetty, Danny, Rex, Andy, Dolly and Toby. From the Centre Community, there will be Bobby and Lenny, and from the Southern Community, there are Darcy, Aunties Lilly, Irene and Polly, and Uncle Tom.

I have adopted the autoethnographic strategy '*voice*' to impart myself into the narrative, writing in the first person while 'Speaking as Self' (McMahon & Dinan-Thompson, 2008; McMahon et al., 2012), as a reflexive medium for recounting past events, and conversations between 'Self' and the 'Others'. The reader will be formally and contextually introduced to '*voice*' in Chapter Two, with further encounters in chapters Three to Five.

1.5.5 Background to the Original Study

Deciding on just how to proceed with developing the 'two-way' Earth Science textbook was agonisingly problematic, and further complicated by a complete absence of any precedent of a cross-cultural, curriculum development nature. All I had were these visions in my mind's eye, a 'gut feeling' that I was heading vaguely in the right direction. I was

originally strongly advised, purely on practical grounds, to restrict the Book Project to one Community, the 'Top-End' in Arnhemland, because of the inherent expense, time and logistical demands behind the fieldwork. However, I persisted with the 'vision', because I felt it was critically important for the Book Project to reflect the diversity of Aboriginal Australia. Wonderful friends and acquaintances were the initial contacts for the three communities ultimately chosen.

Adding to the challenge was the realisation that the appropriate, and essential, cultural knowledge would have to be obtained from the primary sources – Indigenous knowledge holders as recognised by their Communities. This meant developing a cooperative and collaborative working routine with the respective Elders and Traditional Owners within each Aboriginal Community. My original estimate of a twelve-month timeline was greeted with wry smiles; the reality was closer to ten years. 'Learning the ropes' culturally speaking, while working in each community, was always fascinating, but at various times frustration, excitement and fear added to the mix.

The data collection phase for the original Book Project occurred between 1992 and 2001. Some material such as the sequential imaging necessary to capture an ancestral being's route across the landscape would occupy three days on one trip. Similarly, so was collecting images of the necessary geological specimens. The recording of the Dreaming accounts, necessarily on location at the relevant cultural sites, followed by the transcription and translation of the narrative amounted to two full years at both the Top-End and Centre Communities.

It was impossible to predict an exact outcome for a fieldtrip, particularly so for the two traditional communities. On several occasions I found on arrival that the senior cultural person or Traditional Owner, who was key to achieving the primary goal, was unavailable

due to cultural responsibilities or ceremonial commitments, such as ‘Sorry Business’ or ‘Men’s Business’. So, wherever possible, I would implement a back-up strategy to collect alternative data, and postpone the scheduled, intended job until the next visit. The data collection for this study involved extensive study of all the original data sets, then converting them into an auto ethnographic style narrative, and simultaneously applying a thematic analysis.

My initial acceptance by the three communities varied significantly, as did the time required for building sound and effective working relationships. The two traditional communities were similar in the sense that once I had identified and then established ties with the key Traditional Owner and family, I became more confident with each subsequent visit of being able to continue the fieldwork with minimal disruption.

Visits were initially three to six months apart. I always gave advance notice of dates of arrival and departure, and organise accommodation, however I usually found it was best to finalise arrangements once I arrived, as communication before-hand with specific key people was always problematic. I learnt very quickly from the outset that flexibility was an essential operational quality. In fact, the notion of preplanning fieldwork schedules prior to the community visit was quite fanciful given the unpredictability of cultural events such as ‘Sorry Business’, ‘Men’s Business’, or the Elder being preoccupied with ‘Park’s’ business.

Establishing an efficient working routine within the Victorian Koorie community by comparison, however, was in some respects challenging. It took two to three years to win the necessary trust of some of the Aboriginal Elders, particularly the ‘senior culture men’. Sadly, this reflected how they had been treated in the past by non-Aboriginal researchers. The Southern Community was simply being cautious, because of the legacy of years of ‘white’

mistreatment and disrespect in one form or another. Now, 27 years later, some of these families in the Southern Community are among my closest and dearest friends.

Two teacher workshops were held late 1997 to provide feedback on a final draft in preparation for the trials. These workshops were held in Darwin and Portland. In all, eight secondary colleges, two in Darwin, one in Alice Springs and five in Victoria, participated. The feedback from the teachers and students was then used to complete the final draft. While I initially saw the value in exploring the trial phase for this current study, it became clearly evident that doing so was outside scope

Finding a publisher for the books was in itself a major challenge. For four years I received the same response from eight major education publishers, all variations along the lines of 'It's very interesting work but not commercially viable'. Shortly afterwards I was contacted by Hawker Brownlow. The first book, *Gunditjmara Country* was published in 2002. Sales of the first book were unremarkable, leaving little incentive for the publisher to proceed with the last two. Disappointingly, work on the other two books has remained in limbo, due to a combination of COVID and economic constraints. The publishing matter will be pursued further in due course. My supporters see it as an imperative.

1.6 Link to the Current Study

The original Community based fieldwork associated with the Kormilda Science project, was the basis for this study. The diary entries and field notes recorded during that ten-year period formed the data body that was subsequently analysed for this study. Supplementing the data were my memories retained from that initial period. If it seems puzzling to the reader as to why I bothered to record those notes during the fieldwork period, then I can assure the reader that the recall of the associated memories, at times with startling clarity, has been even more puzzling.

1.7 Outline of Thesis

Chapter One has provided a contextualised overview for this study by situating it firmly within an autoethnographic perspective of Community social networking interactions, face to face conversations between Self and Others towards the co-creation of new knowledge.

Chapter Two provides an overview of the research literature and outlines the argument for the inclusion of Aboriginal cultural material in an Australian state secondary science curriculum. It commences with an overview of the concept of culture and its translation and transposition, progressing to exploring aspects of relevant pedagogical processes for teaching two-way education. The concepts of third space and contact zone are then explored as mechanisms for social engagement within the Aboriginal Community.

Chapter Three provides an examination of the methodology and methods as they apply to this study. The Ontological, epistemological and axiological aspects that background the Autoethnographic approach are explored. The thematic analysis mechanism is then described at some length.

Chapter Four provides a discussion of the analysis of my findings. An examination of the concept epiphany appropriated within an autoethnographic context is followed by exploration of the stages of social network development within the Community. Other key elements covered are the different talking types encountered and their link to Community location and participant. The chapter closes with an examination of the enabling and inhibiting factors that influenced engagement with Community and provides a summation of the overall findings.

Chapter Five provides the discussion of the findings: those that were supported by the current research literature, those that were not and, ultimately, the findings that contribute to new knowledge.

Chapter Six provides a summative account for this study, by progressively addressing the main research question by treating each of the sub-questions, then providing the details of the contribution to scholarship, limitations of this study, and recommendations for future research in the field.

The following chapter explores the research literature, establishing a theoretical base for this inductive study. It provided a challenge with predicting what lay ahead prior to deciding upon the methodological approach and then attempting to pre-empt the findings from the analysis.

2. Chapter Two

It is Friday 26 April 1996, and I am sitting with Jack, a local Traditional Owner, out under a banyan tree across from his house. His wife has set sheeting on the ground for us, and I have just asked Jack if he thought there was a thing called Aboriginal science. He took a while to settle into answering but responded:

> *We do have science. … We used to do a lot of burning. We've got a word for that. Actually, I might, I'll get 'Park'[1] to post to you, a help for all these seasons, and it's good, it's written in language and in English and they got photos of rain and wet season, and it's a good one. It's just like a calendar. Yes, we got science. Besides that, we got science you can look at. Before wet season you get flowers on trees, that's easy, you know you are going to have red apple. You know you will be having plums, of all different kinds. But we've got science that tells you too, like insects. We must take a photo of this for them kids, for any kids. We've got grasshoppers that when it gets bigger, it's all green, all green grasshopper. When it gets fat, or when I think it has eggs, that tells us that yams are ready. It's straight after wet season. This time of year, when you see that grasshopper, you will know. All the grasshopper are full grown now, so the yams are ready. You can go and dig out yams. And lilies. Other science, we still use for fishing. Like rivers and creeks. We look at these little spear grass or this big, tall spear grass that turn to brown now. You don't see them having seeds anymore, but they have seeds and they open up. And, after a few months, a few weeks, they have green, big round*

[1] Jack was then a member of the Kakadu National Park Management Board.

seeds on them and that means fish are ready. You can go and pick traps.

You can go and do fish hunting.

Speaking as self[2]

These were still early days with the book development work, and I was still framing ideas about how it was all going to work. Jack was my mentor and facilitator–liaison, my Top-End go-to-man! Obtaining his feedback was one of the critical factors to getting the book done right, and I was learning a lot, and not all of it was to do with the bookwork. I was learning as much about myself as everything else while on the job, because Jack and the Others in the Community were by degrees, subtly teaching me how to conduct myself and do things the 'proper way'. They were so patient with me, but the expectations were there. Aboriginal pedagogy at work.

2.1 Review of Relevant Research and Theory

This chapter outlines the argument for the inclusion of Aboriginal cultural material in an Australian state secondary science curriculum. Wherever possible, the references used are from case studies grounded in field research. Other references used are based on a review of research-based literature. Knowledge systems are explored. The contestability of the 'empirical' status of science is examined. My exploration of the research literature focuses upon the salient features of Community, cross flow of knowledge, with an emphasis upon Indigenous knowledge and associated concepts involved with interpersonal cross-cultural verbal communications pertinent to Community.

[2] For the reader's benefit here, 'Speaking as self' is applied to the text that follows. 'Speaking as self' is an auto-ethnographic tool that I use to write my story in first person and includes dialogue, emotion and subconscious thoughts. It presents and explains the importance of 'Self' in relation to my-self, my-voice/s and the voice of others in the writing of this paper. Further context and explanation are given on page 99.

Other issues deemed pertinent to this study include the nature of science itself, and how the working definition of this field of knowledge has changed with time. This is followed by an overview of the debate concerning the inclusion of Indigenous knowledge systems (IKS) in school science curricula. My focus then shifts to two social constructs, specifically the contact zone and the third space. The contact zone is discussed with reference to social spaces as defined by Pratt (1991), while the third space can be understood as a social construct, a social transition space as defined by Bhabha (1994). I present these two social constructs to provide grounding for exploring and explaining the social interactions between Self and Others within the three Aboriginal Communities.

I then examine the two main pedagogic processes, Ogunniyi's (2007) contiguous argumentation models, and Aikenhead's (1997) collateral learning based, cultural border crossing paradigm by which cultural content can be assimilated into a secondary school science curriculum. By reviewing the literature that pertains to developing culturally inclusive science curricula, I hope to be able to rationalise and argue a case that situates my original work with my Aboriginal Community participants within a pedagogical context. I conclude the chapter with a review of the literature surrounding our understanding of the concept of culture. I also attempt to link with and draw upon the ontological, epistemological and axiological perspectives as they apply to this study. It is my belief that our idea of Culture, with all its inherent and attendant elements provides the foundational footings for my current work.

While my methodological design was inductive in approach, it has been possible to identify some fields of academic research that appear to connect with and have relevance to the research question and sub-questions. These fields also apply to the inclusion of Indigenous knowledge within secondary science curricula.

2.2 Culture and its Transfer by Translation and Transposition

It is fitting to commence this chapter with an exploration and appraisal of the central concept 'Culture' simply because culture provides the essential stepping off point from where, for the purposes of this study, matters scientific arise and within which they are integrated. A substantive part of this chapter works around cultural dimensions and aspects – specifically Indigenous culture. The term 'Culture' can be used to refer to an individual's habit of mind, the development of a whole society, or the whole way of life of a group of people (Rojek, 2007, as cited in Chigeza & Jackson, 2012, p. 1).

Given the embeddedness of Aboriginal culture throughout the original book research, I feel it appropriate to spend some time developing an overview of the concept together with its inherent and accompanying concepts 'translation by rewriting 'and 'translation by transposition'. I feel that in doing so, I can in effect provide an overarching perspective that adequately covers and provides for a deeper understanding of most of the work described in the preceding pages. By this I am referring to the research involving cross-cultural border crossings, culturally inclusive school settings, contiguous argumentation, and its associated dialogic implementation argumentation method.

Conway (2012, p.277) notes, 'Culture is a term with a rich and complex history…'. He (2010, p. 349) writes '"Culture" can be defined in a myriad of ways, because its meaning is meandering and never fixed'. Rothman (2014, para. 2) in his article for *The New Yorker*, comments that:

> It goes without saying that 'Culture' is a confusing word, this year or any year. … The problem is that 'culture' is more than the sum of its definitions. … Each time we use the word 'culture', we incline towards one or another of its aspects: towards culture that is imbibed through

> osmosis or the culture that is learnt at museums, towards the culture that makes you a better person or the 'culture' that just inducts you into a group …

For anthropologists and other behavioural scientists, culture is the full range of learnt human behaviour patterns. The term was first used in this way by the pioneer English Anthropologist Edward B. Tylor (1871), who in his book *Primitive Culture*, said that culture is 'that complex whole which includes knowledge, belief, art, law, morals, custom, and any other capabilities and habits acquired by man as a member of society'. Tylor was the first to theorise the construct of culture, defining culture as 'that complex whole … any other capabilities and habits acquired by [a person] as a member of society' (Tylor, 1871, p. 1, as cited in Schim et al., 2007, p. 104) wrote:

> Civilisation, taken in its wide ethnographic sense, that complex whole which includes knowledge, belief, art, morals, law, customs and any other capabilities and habits acquired by man as a member of society'. It is perhaps not surprising therefore that 'Cultural translation' is a term used in a range of disciplines, … and in many different ways.

> Anthropologist Clifford Geertz (1973) conceptualises culture as symbolic experiences in people's lives. Botelho and Lima, (2020, p. 312) refer to the significance of this definition of culture because '…culture is no longer just in people's minds but represented through their daily practices'.

Buden and Nowotny's (2009) position paper opened a new rubric for cultural translation studies and promised valuable insights into cultural practises of transfer of knowledge. They (2009, p.198) write that 'Etymologically, "translation" evokes an act of moving or carrying across from one place or position to another, or of changing from one

state of things to another'. Multiculturalism, in its contemporary context, has developed its own concept of cultural translation, 'inter-cultural translation', a metaphor for different sorts of successful, respectful, tolerant, inclusive cultural interactions between individuals and communities assumed to belong to different, clearly distinguishable cultures. Buden and Nowotny (2009, p. 200) opine that the concept 'is modelled on the interaction between cultural groups, typically minorities and majorities, within a state, and takes place within a national community or state…'

Conway (2012, p. 265) contributes further here, writing that 'culture refers to at least three distinct but related ideas'. For Conway (2012), it first refers to the shared set of taken-for-granted assumptions that structure how members of a community make sense of the world. Second, it refers to objects or artefacts that communities invest with meaning, where these assumptions become manifest. Third, it refers to the communities themselves whose members share a common culture in the anthropological sense, with all its symbolic trappings. Conway (2012, p. 265) cites a useful shorthand by Collins (1990) 'describing culture in the first sense as "anthropological culture", and in the second sense as "symbolic culture"'. Conway (2012, p. 264) adopts his own shorthand for the third sense of culture, as 'culture as community' and refers to cultural translation as 'an idea – or rather, a frequently messy collection of ideas that has captured the imagination of scholars in fields ranging from anthropology to translational studies, to culture studies'.

Conway (2012, p. 264) goes on to say, 'Scholars do not define what they mean by it, presuming that others share their definitions even when they do not'. As a means of providing 'logic' to the notion of 'cultural translation' Conway (2012, p. 266) provides a matrix of concepts devised by pairing three meanings of 'culture' with two meanings of 'translation'. To construct this two-dimensional matrix, Conway (2012, p. 265) adopts 'translation' as '…

at least two distinct but related ideas', and refers to '…the etymology of "translation", … meaning to carry across, to explain the concept'. In an anthropological and ethnographic context, Conway (2012, p. 265) works from Geertz's (1973) notion of 'culture as text', by interpreting this concept as 'translation as writing'. In other words, the written text becomes the cultural carrier.

The second distinct idea about 'translation' is 'For scholars from the field of post-colonial literature, what is "carried across" is not so much culture, as people who leave their place of origin and enter a new locale, bearing their culture with them'. Conway (2012, p. 265) refers to this as 'translation as transposition'. Of Conway's 'six modes of cultural translation', the one that appears to relate most closely to ethnographic field research and writing, as performed by anthropologists and other scholars, is twofold: Firstly, the notion of 'translation as rewriting', as an explanation of a foreign interpretive horizon, and secondly, 'Translation as transposition' where the foreign interpretive horizon is transposed into a new locale.

In his attempt to provide a clear structure, with less ambiguity, and appealing to empiricism, Conway (2012, p. 271) pursues a workable definition for 'cultural translation' by constructing a second conceptual matrix to better define 'cultural translation as transposition'. Conway (2012, p. 270) states that his goal '… is to map out different acts, contexts, and effects of cultural translation as a function of the position occupied by the person acting as translator'.

Conway (2012, p. 265) closes his paper on a cautionary note, by referring once again to 'cultural translation' as a messy concept, citing Geertz (1973, p. 4) explaining that people '… try to apply it and extend it where it applies and where it is capable of extension; and they desist where it does not apply or cannot be extended'. Conway (2012, p. 265) concurs:

> This is the approach we should now take with 'cultural translation' – we should apply and extend it where it is possible to do so, but we should also recognise where it is not possible … The analytical value of 'cultural translation'… is the value of an empirical approach based on a conceptual map … concrete examples will help us refine theories of cultural translation.

The literature contains examples of cultural translation in the fields of health, economics, and the sciences.

DePue et al.'s (2010, p. 2091) research studies their 'Experience with cultural translation, drawing on an emerging implementation science, which aims to build a knowledge base on adapting interventions to real world settings'. Translating effective medical treatments into routine medical practices for communities at risk is an increasing health priority. The challenge however is to develop new research frameworks to help guide the adaptation process, to facilitate medical access to low income, minority or ethnic communities. One such framework is translation research, which has been applied to transfer effective, efficient and sustainable solutions to, for example, the treatment of diabetes. This entails, in part, the process of cultural adaptation, an integrated process referred to as cultural translation (DePue et al., 2010, p. 2090). The adaptations were considered feasible for the West Samoan setting, although several challenges faced the researchers.

It was realised by DePue et al. (2010) that medical procedures had to be flexible enough to accommodate the cross-cultural challenges. The research team were mindful of the multiple layers of cultural translation, bridging not only the ethnic cultures, but also medical and research cultures, and to be respectful to each other. When the different cultural values appeared to be incompatible, the researchers tried to find common ground and to retain the

most important features of each value system. The researchers end on a cautionary note, similar to that voiced by DePue et al. (2010, p. 2091), 'How far can we adapt an intervention before it becomes a different intervention altogether, and we have lost fidelity with the original treatment?' Conway (2012, p. 276) applies a reality check, by observing that '…because of its popularity and because of scholars' frequent assumptions that what it means is self-evident, the concept is messy'.

The literature indicates parallel cases of cultural translation in an Australian context, with the Department of Health, Victoria (2011, p. 44) Rural and Regional Health Plan emphasising '…translating research into evidence-based treatment and clinical practice', and that 'Ensuring that the diverse communities of rural and regional Victoria receive high-quality, safe and culturally sensitive healthcare is an important priority' (p. 56).

An example of cultural translation as transposition, in an economics context, is provided by Wang's (2015) case study where the cultural translators are returned migrant skilled workers. The workers had become skilled in the US, before returning home. The case study examines these workers in their role as cultural cross-border brokers, who were transposing knowledge about organisational practices from the US back to their home country. The levels of knowledge transfer were examined against two sets of criteria – organisational and cultural – determining the success of the skilled worker as a cross-border knowledge broker. Embeddedness within both host and home country increased knowledge transfer success, and they also interacted positively.

At the organisational level, the presence of other returnees in a home country workplace decreased the positive effect of the host country's embeddedness, whereas similarity between a returnee's industry background and the home country's industry increases it. The evidence from this study highlights the challenges returning skilled workers

encounter in their homelands despite being characterised as ideally positioned to broker cross-border expertise. This case study appears to correlate with Conway (2012, p. 271) who refers to ‘acts of cultural translation’, where immigrants ‘conform to imposed national identity’ and ‘perform ongoing negotiation’. Wang’s references to ‘embeddedness’ appear to confirm Conway’s (ibid.) notion of ‘context of translation’ as being evidenced by ‘situations where identity or group membership are determined’ and ‘Contingent moments that constitute every-day life’.

2.3 Community Engagement Enabling Concepts

Two concepts found in the literature that have strong associations within autoethnographic methodological research, and particularly for Indigenous-related research, are the ‘Contact Zone’ and ‘Third Space’. These two concepts will enable me to more readily extract and present those more sensitive elements of the story, revealing understanding and knowledge pertinent to those emotive moments of interpersonal connections, which often evade capture. These concepts will enhance the richness and context of the narrative. Contact Zone and Third Space equally occupied a primary position in terms of my engagement strategies with the Aboriginal Community members. I have always been very conscious of the way in which I engaged with the participants, particularly during the early days. Encountering the initial sensitivities, overcoming the awkwardness, ignorance, and inexperience on my part was a matter of working my way through some tough moments. Negotiating the inevitable uncomfortable moments was all part of the learning curve, all made easier by the people who were incredibly kind, giving and patient with me. So, it was inevitable that these two concepts jumped out at me, well before I embarked on the analysis journey.

2.3.1 Contact Zone and Third Space

The literature reveals that contact zone and the third space are not uncommonly used in auto ethnographic studies. Pratt (1991), whose seminal work specifically links the 'autoethnography' with the 'contact zone', has generated a wealth of valuable research conducted across cultural borders. Haggis et al. (2007) states that the notion of the 'contact zone' as first elaborated by Mary Louise Pratt (1991) reconceptualised colonialism as a space of cross-cultural interaction and agency rather than as a static picture of domination and incorporation.

Drawing the 'contact zone' into an autoethnographic context, DeWilde & Skrefsrud (2016, p. 1034) states 'Theoretically, we draw on Pratt's (1991) concepts of "contact zones" and "autoethnography". The contact zone is an idea, which Pratt develops in opposition to the tendency to analyse culture, identity, and language as if they were stable, monolithic, and coherent'. Haggis et al. (2007) explores the hypothesis that the concept of 'contact zone' expresses the contemporary global border between developed and developing societies, as it pertains to refugee settlement in Australia. They opine that 'The border also has its uses in conceptualising the character of this contact zone'.

Researching the literature for 'contact zone' with reference to educational research in Indigenous communities, however, reveals it has been paid scant attention. Indeed, when we refine the search to autoethnographically based science educational research in Indigenous communities, the results are zero. As a research tool, it appears to have a well-recognised and legitimate place when conducting collaborative research in multi-cultural communities. A representative sample is provided by Somerville (2010), Bartlett (2011), Schorch (2015), DeWilde & Skrefsrud (2016), Beck (2013), O'Connell (2017).

Manathunga (2009, p. 170) states that ‘Engaging in research in the intercultural contact zone enables researchers to harness synergies, interconnections and relationships to develop new knowledge and ways of conducting research. As a result, researchers are likely to experience a process of transformation where ideas and ways of operating are critically blended’. Somerville & Perkins’ (2003, p. 265, as cited in Manathunga, 2009, p. 171) work, highlighted how their actual collaboration did not take place in the physical ‘formal and proscriptive rituals of joint meetings and consultation’ but in the ‘cultural and intellectual spaces and border maintenance and crossing inherent in the contact zone’. As a result, new research knowledge was created and disseminated to a range of political, educational and community audiences, and the ways of conducting research in Indigenous communities were transformed.

Borch (2011, p. 113) refers to the term ‘third space’ as ‘a particular way of thinking about and interpreting socially produced space’. This study explores the challenging question of just how educators build bridges between the Indigenous and Western knowledge systems. In working towards possible solutions to this challenge, it has been suggested by Queensland’s education department in its EATSIP document (Dept. Education and Training, 2011, p. 9) that ‘Perhaps the response to this challenge is the creation of the third cultural space’.

Martin (2003, as cited in Queensland’s Dept. Education and Training, 2011, p. 9) refers to the ‘third cultural space’ as being a process that draws on the rich Aboriginal and Torres Strait Islander histories; perspectives; ways of knowing, being and doing, balanced symbiotically alongside Western ways of knowing, being and doing. Furthermore, Williamson and Dalal (2007, as cited in Klenowski (2009, p.11) sees the third space as a bridge, stating that ‘There is a call for educators and institutions to build bridges between

Indigenous and Western knowledge systems to achieve meaningful outcomes for Indigenous students in particular but for all students in general'.

Schorch (2015, p. 77) argues for the connection between the concepts 'contact zone' and 'third space'. He addresses the 'humanising of the museum as "contact zone" through interpretive actions, movements and performances made by museum visitors or cultural actors', and concludes by referring to the visitors undertaking a cross-cultural voyage and their subsequent construction of bicultural meanings.

Schorch (2015, p. 77) continues with, 'The intervention of the tour translated a 'contact zone' of physical encounter into a dialogic 'third space'. Schorch's paper interestingly reflects my own narrative journey from cross-cultural dialogue to bicultural meanings.

Perhaps most identifiable with my own study was Margaret Somerville and Tony Perkins' (2010) collaborative work with the Gumbaynggirr community on the northern NSW coast. They develop a model of the contact zone with a range of specific kinds of 'border work' undertaken by researchers and the community members. This involved sometimes maintaining borders of difference, sometimes crossing borders of difference. So, working collaboratively in the cultural contact zone was not without its occasional challenges, as a comment from Somerville (2010, p. 16) illustrates:

> Tony clearly understood the purpose of our work as a political tool, a tool to help Aboriginal people 'gain the power behind our statements. He explained his understanding of our collaborative research processes through his 'border work', making clear our different perspectives. From many conversations about the politics of representation, we identified different sorts of border work that were critical to our negotiations in the

> contact zone. 'Border work' was precarious, risky, and sometimes difficult emotionally for all of us in what we came to call the 'discomfort zone' of cultural contact in our research. … We found the discomfort zone to be a creative space where the tension of difference has the potential to produce new understandings and new possibilities.

2.4 Autoethnography and the use of Reflexivity

Reflexivity has played a large part of the current study, recognising that my original book project field notes and diary entries were significantly underlined and formed through the reflexive process.

According to Reed-Danahay (2017), autoethnography evokes questions about the nature of ethnographic knowledge by exploring the persistent dichotomies of insider versus outsider, distance versus familiarity, objective observer versus collaborative participant, and individual autonomy versus Community culture. Furthermore, an 'autoethnography reflects a view of ethnography as both a reflexive and a collaborative enterprise, in which the life experiences of the anthropologist and their relationships with others "in the field" should be interrogated and explored' (Reed-Danahay, 2017, p. 145). More recently, Lapadat (2017, p. 589) posits that 'AE is reflexive and positions the researcher within the study, in that the author of an autoethnography is both subject and researcher'. Broadening the reflexive perspective, Tilley-Lubbs (2018, p. 11) suggests that:

> Through intense reflexivity and introspection, the researcher can examine Self as participant, not trying to present facts as objectively as possible, as occurs with autobiography, but rather acknowledging that the interpretation of facts reflects cultural perspectives shaped by years of

sociocultural, sociohistorical, socio-political, and socioeconomic events and circumstances.

I have previously mentioned my determination to learn more and progressively better prepare myself for each subsequent field trip associated with the original bookwork, specifically how best to engage and converse with my Aboriginal participants in order to do things the proper way. The field notes and diaries were the primary trove of data to look back on, reminders of what went well, and what needed improving in terms of how I conducted myself in the Community. The data was the primary source for my analysis, when writing my analytic memos, and often I would supplement these by memories of the event. Both processes, back then and now, require reflexive thinking, pondering over what had taken place, endeavouring to extract useful information. When I stepped into the Communities my understanding of why and how I was asking particular project research questions increased over time, realising how my limited Western-centric perspective and worldview was being vastly expanded and balanced by being taught the Aboriginal way, by the Elders and Traditional Owners, and, often through a subtle process of enculturation where I became sensitised to the Western tendency for cultural bias.

An example of the reflexive process adopted for this study is given in Chapter Three, Section 3.4.

2.5 Embracing Indigenous Knowledge Systems

By way of introducing this section, allow me to speak briefly about my own initial encounter with Indigenous Knowledge systems. It was a veritable opening of a treasure chest, a wonderful opportunity to embrace and explore opportunities to combine two world views, the Aboriginal and the Western Scientific. It was my humbling experience to be welcomed and allowed to share in the Aboriginal culture and Knowledge drawn from 3 Communities.

Though diverse, these Communities provided a common grounding: supportive, affirming and warm. My Aboriginal participants, my friends, helped me forge a path and journey through co-created gardens of Aboriginal and Western Science Knowledge, which in turn provided a both-ways look at our Australian landscape. We all learned together on our journey of self-discovery.

The Western scientific world is becoming more receptive to the inclusiveness of Indigenous knowledge systems, basically because of their perceived inherent value on both spatial and temporal scales. Western trained scientists are increasingly recognising and turning to Indigenous knowledge systems (IKS), in both complementary and supplementary capacities, to augment scientific research.

Kates (2011, p. 19450) states that sustainability science, as described in the Proceedings of the National Academy of Sciences (PNAS) website, is '…an emerging field of research dealing with the interactions between natural and social systems, and with how those interactions affect the challenge of sustainability: meeting the needs of present and future generations while substantially reducing poverty and conserving the planet's life support systems'. Sustainable development is one of the most significant challenges humanity now faces on both global and local scales.

It is only in the last decade that there is growing recognition that Indigenous Traditional Environmental Knowledge (TEK) makes an important contribution to environmental and social sustainability. (Aveling, 2013; Barbour and Scheslinger, 2012; Brennan et al., 2012; Huntington, 2011; Leach and Fairhead, 2002; Rist, 2006; Stevens et al., 2014; and Wilder et al., 2016). Abu et al. (2020, p. 757) stated that:

> Although researchers now recognise that Indigenous knowledge can strengthen environmental planning and assessment, little research has

> empirically demonstrated how to bring together Indigenous knowledge and Western science to form a more complete picture of social-ecological change.

They present a case study, which exemplifies the bridging between western science and Indigenous knowledge systems. The 'two-eyed seeing' approach brings together Indigenous and Western perspectives on an equal basis to collect and analyse changes in a Canadian river system. The study found corroboration between the two knowledge systems.

Johnson et al. (2016, as cited in Abu et al. 2020, p. 22) conclude by saying that the different knowledge sources were found to have inherent strengths and limitations. The strengths of one were drawn upon to overcome the limitations of the other. Bridging activities also require that Western-trained scientists be open to reflecting on their practices, embracing other ways of knowing, and adopting new strategies for conducting research – challenges that are only now being seriously discussed in interdisciplinary research.

Vickers (2007, p. 592), explains the connect between the Indigenous ways of knowing and the Western scientific way from an Indigenous perspective, stating:

> The question is not about whether or not we as Indigenous peoples have a scientific way of relating to the world, for Nobel Peace laureate and physicist, Richard P. Feynman (1998, p. 5) defines science as simply, 'a special method of finding things out … the body of knowledge arising from the things found out…and the new things you can do when you have found something out, or the actual doing of new things'.

Tengö et al. (2021, p. 8), working from a citizen science perspective, report that 'The Kimberley Science and Conservation Strategy identified that integrating Indigenous peoples'

knowledge and Western science is a key element to ensuring the best outcomes for the management and conservation of the Kimberley coastal and marine environment into the future'. It is becoming increasing evident that continuous, reflexive dialogue with Indigenous local knowledge (ILK) holders is crucial for stewardship of biodiversity and ecosystems. Tengö et al. (2021, p. 515) state that 'Working with multiple knowledge systems requires scientists, ILK holders, and laypeople to embrace flexible, reflexive, diverse, and at times divergent modes of making meaning and truth claims. This requires epistemological agility (Haider et al. 2018), methodological openness and, in many cases, an ability to work with dissensus so that the narratives produced can be held in tension'.

2.6 Examining the Nature of Science as Knowledge System

In the following section of work, I demonstrate that the systematically organised body of knowledge referred to now as 'science' was never originally seen as the prerogative of any particular school of thought, nor was it envisaged as a repository of knowledge for any specific ontological discipline.

A core rationale for this thesis is provided by Barnhardt and Kawagley (2005), who encapsulate and mirror the central themes with this statement:

> The depth of Indigenous knowledge rooted in the long inhabitation of a particular place offers lessons that can benefit everyone, from educator to scientist, as we search for a more satisfying and sustainable way to live on this planet (Barnhardt & Kawagley, 2005).

Rasmussen et al.'s (2011) research provides an historical context to the Aboriginal occupation of Australia. Their DNA-based research reveals the ancestors of Australia's Aboriginal people separated from the ancestors of other human populations some 64,000 to 75,000 years ago. Australian Aboriginal ways of knowing embrace what is collectively

termed traditional ecological knowledge (TEK), which Leonard et al. (2013, p. 624) define as '…knowledge of the environment that is derived from experience and traditions particular to a specific group of people'.

For Australia's Aboriginal people, the time to collect, hunt and fish is related to the season, the associated weather conditions, and phenological events, all ecological knowledge that was acquired through practical experience. Leonard et al. (2013, p. 628) report that Aboriginal people '…traditionally relied on such knowledge to ensure food, water, shelter, medicines and other resources. Physical and biological events served as indicators of change and were interpreted as signals that particular actions needed to be undertaken at certain times (including the hunting and harvesting of food sources, cultural ceremonies and practices)'.

Walsh et al. (2013, p. 18), in the context of TEK, refer to the '…socio-political processes by which Aboriginal people spatially extend their knowledge across vast distances in Australia, for example, customarily through knowledge of songlines and in contemporary settings through meetings and conferences'.

My personal diary and field notes recorded during my book project reveal 'ancestral' related discussions with two of the Traditional Owners, Aunty Penny from the Top-End and Bobby from the Centre Community, both of whom were key Traditional Knowledge contributors to the original bookwork. The cultural content and historic context to their traditional narrative accounts appear to provide evidence for the longevity of Aboriginal oral knowledge. Aunty explained once, while out on Country, that the two dogs in her Djang, or Dreaming account in the Top-End Community, originated from across the sea to the north. And they were definitely not dingoes, because I was initially puzzled about it and asked Jack to clarify. He told me that Dingoes, even when raised from puppies, were impossible to domesticate. Western science also tells us that these dogs originally arrived in northern

Australia with Malaccan fisherman some 500 to 600 years ago. Aunty Penny's Traditional Knowledge provides evidence for the tenacity and power of oral history.

Similarly with old Bobby's Dreaming account, or Tjukurrpa, as it is referred to in the Centre. It details his cultural connection to Country, through his Ancestral Being, the Golden Bandicoot. The details of the Bandicoot's movements and actions are described in a comparatively short section of a lengthy songline. Bobby had the sole traditional rights to this section, to know it in detail and to sing it. The passage explains how the Bandicoot had commenced its journey from hundreds of kilometres away in Western Australia and continued across the landscape into Arrernte lands, close to Alice Springs. My recording of Bobby's song while on Country, was translated by Ken, an expert in the language. But Ken had to admit that some of the Song's words were that archaic he could not faithfully translate them, and interestingly, old Bobby couldn't tell him either. Lost to antiquity.

Further evidence from my own records that seem to support a much broader locational context for TEK and the extreme lengths of time associated with Aboriginal Traditional Knowledge. The critical relevance to the book project work, from an Earth science perspective, was that these ancestral beings created well defined topographic features during their travels across the landscape. The two Traditional Owner accounts provided above highlight the ability for oral history to transcend time while retaining details pertaining to Country and its topography. These reflect well on how Indigenous Traditional Knowledge is used to supplement research in biological and ecological sciences here in Australia and internationally.

2.7 Modern Western Science – a Problematic Definition

Aristotle, generally recognised as the premier and original philosopher, provided an unprecedented rationalisation to man's connection with his universe. He coined the names of

four fields of study that lie within that branch of philosophy now known as metaphysics. The term ‘science’, from the Latin *scientia*, simply meant ‘knowledge’.

‘The origins of science go back to ancient philosophies (e.g., Egyptian and Greek), while its evolution can be marked by major social transformations in Europe. Understanding this evolution helps clarify the term science’ (Aikenhead & Ogawa 2007, p. 542).

It is only in recent times that the original concept of science has been transformed into a narrower definition, referred to as Western modern science (WMS). Central to WMS is the scientific method that assumes that we can learn about the world around us through observation, experimentation and testing of hypotheses. If we look at Chalmers (2013, p. 1) assertion that ‘Science is to be based on what we can see, hear and touch rather than on personal opinions or speculative imaginings. If observation of the world is carried out in a careful, unprejudiced way then the facts established in this way will constitute a secure, objective basis for science’, then we can see the potential for including Indigenous knowledge as part of the scientific spectrum.

By the end of the 18th century, ‘knowledge’ had begun to be referred to as ‘science’ to distinguish it from its philosophical background. Around the start of the 20th century, however, philosophical debate developed around ‘scientific method’, subsequently turning natural philosophy into an empirical activity. Consequently, unlike the rest of philosophy, science was seen as being derived from formal experimentation. Hence, it is only in recent times that the original concept of science has been transformed into a narrower definition, referred to as Western modern science (WMS). Central to WMS is the scientific method that assumes that we can learn about the world around us through observation, experimentation, and testing of hypotheses.

Traditionally, among the most influential and compelling of these essential traits for science, is the criterion of falsifiability (Popper, 1959, as cited in Hughes, 2012, p. 34). The canonical view of theory testing is that one tries to falsify the theory, because all scientific theories are deemed testable. Hence, any theory or explanation that cannot be falsified is reasoned to fall outside the science domain. The argument is that under a given set of experimental conditions, the theory might be falsified by performing the experiment and comparing predicted to actual results. The reality, however, reveals that no matter how carefully scientists adhere to scientific method, research outcomes are neither totally objective nor unquestionably certain (Crotty,1998; Goldhaber & Nieto, 2010; Hughes, 2012; Popper, 1959).

Some scientists refer to the standard account of science, where consensus within the scientific community ultimately determines what qualifies as science. This leads us to the debate, for example, about whether science includes knowledge about nature. The debate around what constitutes science, and the associated scientific method, remains as vigorous as ever within the contemporary Western scientific world, inclusive of science education (Hepburn & Anderson, 2021; Cobern & Loving, 2001; Hughes, 2012;). Cobern and Loving (2001, p. 60) refer to the so-called standard account of science, where what ultimately qualifies as science is determined by consensus within the scientific community. The presuppositions of science include the possibility of knowledge about nature, which realists view as actual knowledge and idealists as instrumental knowledge. Closely linked to the presupposition of knowledge are the presuppositions of order and causation.

Hughes (2012) provides a further example with more qualification regarding the sciences philosophical background, the physicists Stephen Hawking and Leonard Mlodinow, open their book, The Grand Design, by asking:

> What is the nature of reality? Where did all this come from? Did the universe need a creator? … Traditionally these are questions for philosophy, but philosophy is dead. Philosophy has not kept up with modern developments in science, particularly physics. Scientists have become the bearers of the torch of discovery in our quest for knowledge (Hughes 2012, p. 38, citing Hawking & Mlodinow, 2010).

The debate about the identity of science continues. Recent debate has questioned whether there is anything like a fixed toolkit of these scientific methods, which is common across science and only science. (Anderson & Hepburn, 2021). Indeed, the layperson may well be excused for confusion about what 'science' really is in the contemporary world.

The evolutionary biologist Austin Hughes is an ardent proponent of what is referred to as 'true science'. Hughes recognises that practising scientists, like all other people, are prone to philosophical errors. Hughes (2012, p. 33) talks about a set of 'essentialist' theories of science that '…attempt to identify the essential traits that distinguish science from other human activities or differentiate true science from non-scientific and pseudoscientific forms of inquiry'.

Among the most influential and compelling of these essential traits is Karl Popper's (1959, p. 34) criterion of falsifiability. Essentially, a falsifiable theory is one that makes a specific prediction about what results are supposed to occur, under a set of experimental conditions, so that the theory might be falsified by performing the experiment and comparing predicted to actual results. As he stated, 'A theory or explanation that cannot be falsified falls outside the domain of science'.

Goldhaber and Nieto (2010, p. 940) describe testing scientific theory, as 'The canonical view of theory testing is that one tries to falsify the theory. One compares its

predictions with experiment and observation'. They note further that 'Of course, without strong "ground rules" it is impossible to falsify a theory because one almost always can find explanations for a failure'.

A further key criterion for a scientific theory, is its replication, or alternatively as reliability, or reproducibility. Gundersen (2021, p. 1) claims that 'Reproducibility is a confused terminology'. He (2021, p. 10) then offers a definition for reproducibility, stating that 'Reproducibility is the ability of independent investigators to draw the same conclusions from an experiment by following the documentation shared by the original investigators'.

Downing (2004, p. 1006) states, 'In its most straightforward definition, reliability refers to the reproducibility of assessment data or scores, over time or occasions'. Replication involves the process of repeating a study using the same methods, different subjects, and different experimenters'.

These views as defined, however, are not universally respected. Certainly, in the information technology field, where Drummond (2009) asserts that:

> Replicability is not reproducibility. Reproducibility requires changes; replicability avoids them. I use the word 'replicability' to describe the view that I think is prevalent in the machine learning community. In opposition to this, I want to establish that the meaning of the word 'reproducibility', as used in science, is much broader than that.

More recently, the scientific world has been concerned by the replication crisis. Moynihan (2016, p. 28) states 'For those of us who share a faith in science, the growing claims of a "replication crisis" in research come as something of a shock'. Scientists have found that the results of many scientific experiments are difficult or impossible to replicate on

subsequent investigation, either by independent researchers or by the original researchers themselves.

Schooler (2014, p. 9). refers to the replication crisis, stating that 'In disciplines such as medicine, psychology, genetics and biology, researchers have been confronted with results that are not as robust as they originally seemed'.

Self-interest groups have railed against the concept of 'true' science. Wilson (2016, p.10) attacks the 'bloated bureaucracy' and critiques a 'scientism' that worships scientists and treats their evidence as the new 'holy book'.

Psychology, medicine, and physics are all targeted for failing the science method test. It needs to be noted, however, that a 'faith'-based institute founded to 'confront the ideology of secularism' publishes the journal in which this article by Wilson (2016) appears. But the non-sustainability of the traditional, narrow definition of Western science appears evident. The International Council for Science (ICSU 2002, p. 4) has recognised that:

> Science does not constitute the only form of knowledge, and closer links need to be established between science and other forms and systems of knowledge in addressing sustainable development issues and problems at the local level such as natural resources management and biodiversity conservation. Traditional societies, usually with strong cultural roots, have nurtured and refined systems of knowledge of their own, the research community, has not yet engaged in ways of better linking science to other knowledge systems. To do so would bring important advantages to both sides, and provide, to those in need of knowledge for pursuing sustainable development goals, a broader range of empirical information.

Closing on a positive note, Romero (2019, p. 1) observes that while 'Replicability is widely taken to ground the epistemic authority of science', he concluded his review (2019, p. 9) of the social, behavioural and medical sciences by stating that while '…the crisis demands work from the perspectives of the history and philosophy of science, social epistemology, and research ethics. … the crisis should not be taken as bad news but as an opportunity to update our theories and make them relevant to practice'.

2.8 How do Indigenous Knowledges Situate as Science?

Considering the above discussion, an important question is, 'Where does Indigenous knowledge sit on the contemporary science knowledge spectrum?'

The relevant literature is prolific, detailing a broad range of responses and opinions. Posited at one end are the competing claims for what counts as science, and at the other end, references to the knowing of nature as the duality, Indigenous knowledge, and science. (Aikenhead & Ogawa, 2007; Barnhardt & Kawagley, 2005; Clothier, 2014; Cobern & Loving, 2001; Snively & Corsiglia 2001)

The Indigenous perspective on the Traditional Knowledge and Western science quandary provides for a valuable and sobering insight, and contemporary commercial management of natural resources provides some revealing and refreshing insights into the Indigenous perspective, with calls from Traditional Owners and Elders for mutual respect and recognition of both Traditional Knowledge and Western sciences.

This pragmatism extends to the Western-trained scientists, both Indigenous and non-Indigenous, who see both knowledge systems as being equally legitimate and grounded in empiricism. Government authorities will also appropriate Indigenous knowledge systems where it is mutually advantageous to do so, such as in border protection of remote coastlines and conservation of remote arid areas (Christie, 2008; Michel & Gayton, 2002).

The constructivist model for science, with the emphasis on the empirical, has been used to argue against IKS being conceived as science. The corollary being that modern science is considered devoid of culture, in an anthropological sense. Many scholars speak to issues such as the hegemony of modern science, where terms such as ‘standard’ science are to be used, the problematic recognition of ‘alternative’ science and labelling IK as a form of science (Cobern, 1996a, Cobern & Loving, 2001; Keating, 1997; Roberts & Mackenzie (2006)

There are various epistemological stances to constructivist theory, but this interpretation is limiting and unfortunate. The philosophical view is that constructivism supports the belief that the learner makes sense of the world based on their experiences in it.

It appears that the objective reality, which all learners aspire to know and understand, is diffuse and variable. From this context, one can appreciate that there are different types of knowledge. While most societies tend to value some types of knowledge over others, one can also presume that there can be value found in knowledge systems of various cultures. Importantly, it is recognised that this narrow perspective of Western science as being a superior knowledge system, limits the context of discovery, the range of ideas and therefore the potential for new knowledge.

Fortunately, evidence suggests that science is increasingly being recognised as a subculture of western culture and is therefore just one way of knowing. (Aikenhead, 1996; Baker and Taylor, 1995; Cobern, 1996a; Cobern, 1996b; Jegede, 1995; Castagno & Brayboy, 2008).

2.9 Citizen Science

I will introduce this section with the comment that I believe citizen science may have a possible relevance to the analysis and theorising for this thesis simply based on the

suspicion that Community-oriented citizen science projects may serve to demonstrate connections between Aboriginal Traditional Knowledge practices such as mosaic burnings and the emerging recognition among Western scientists of the resultant ecological and habitat regeneration. These periodic localised burning regimes were clearly evident around both the traditional Communities and may figure in some of my conversations with the Aboriginal participants.

Although the term 'citizen science' was coined in the U.S. and the U.K., the practice of scientists working together with other people occurs in many other countries. In Australia, citizen science was established by grassroots activities through a bottom-up approach.

While members of the public have contributed to scientific research in Australia for decades, the term 'citizen science' and the ubiquity of such activities was relatively unknown until recently. Citizen science leaders recognised the need to connect this community, which led to the formation of the Australian Citizen Science Association (ACSA; http://www.citizenscience.org.au) in May 2014 and the first Australian citizen science conference in July 2015. To date, citizen science activities have been identified at community, regional, state and national levels. For most projects, citizen scientists contribute observations of fauna, flora and habitat, though a few projects exist in astronomy, meteorology and seismology.

Citizen science in Australia is also rapidly diversifying into new domains (e.g., online) and disciplines (e.g., biomedical sciences). (Eitzel et al., 2017, p. 8). Eitzel and colleagues (2017, p. 14) define the 'Indigenous/traditional/local knowledge expert or holder' as a 'citizen' in 'citizen science'. Lovett et al. (2007, p. 253) suggest 'Good science involves more than just devising clever experiments to test a specific hypothesis'. They also assert that 'The keys to good science are similar for all forms of scientific inquiry, including monitoring:

good questions, appropriate research designs, high-quality data and careful interpretation of the results' (p. 254).

Lehtiniemi et al. (2020, p. 1) reports that 'Public involvement, also known as citizen or community science (non-professional involvement of volunteers), has become more widely used only recently (since the late 20th century) to support environmental monitoring programs'. Lehtiniemi et al. (2020, p. 7) asserts that '…citizen science can provide a cost-efficient practice to collect presence-only data on distinctly recognisable species, and often gives information that otherwise would be out of the reach of researchers and authorities'. They show that '…citizen science may provide useful data, which can be utilised in targeting management e.g., eradication actions to stop further spread in vulnerable areas when invasion of alien species is concerned…' (p. 7)

Hind-Ozan et al. (2017, p. 290) state that 'Citizen science is, by definition, a collaboration between scientists and members of the public in some form – sometimes this means individuals recruited to help on a scientist-led research project, but in many other cases it can mean partnerships across a wide variety of organisations from many different sectors'. Shirk et al. (2012, as cited by Cigliano and Ballard (2017, p. 4) state that 'Citizen science, or as it is also referred to, public participation in scientific research', has several definitions. The Oxford English Dictionary defines citizen science as 'the collection and analysis of data relating to the natural world by members of the public, typically as part of a collaborative project with professional scientists'. The term 'citizen science' was added to the Oxford English Dictionary (Oxford Lexico) in 2014 as 'Scientific work undertaken by members of the public, often in collaboration with or under the direction of professional scientists and scientific institutions'. However, Bonney et al. (2016, p. 1) correctly point out that this definition does not include the fact that '…citizen science embraces projects in

which volunteers participate in roles *beyond* data collection and analysis; projects in which individuals work not only in teams but also by themselves, with or without the collaboration of scientists;…'

Citizen science is a well-researched scientific technique that uses community volunteers. The technique has been part of the recognised scientific research landscape since 1875 and provides a tangible and plausible connection between both traditional ecological knowledge (TEK) and Western science. It has historically been associated with astronomy and ornithology and more recently with wildlife management. The advantages relate to research of large-scale patterns in nature, requiring a vast amount of data to be collected across an array of locations and habitats over spans of years or even decades (Bonney et al., 2009 as cited in Bhattacharjee, 2005; Couzin, 2007; Dickinson et al. 2010).

Quinn et al. (2018, p. 19) explore and report on '…the growing role of citizen science in aquatic monitoring and restoration as the value of stronger relationships between the science community and public is recognised. Citizen science ranges from solely collecting environmental data to being fully engaged in project conception, design, and delivery'. Citizen science is increasingly being seen as a conduit for local Indigenous Knowledge Systems (IKS). 'There is no doubt that CS initiatives are growing bigger, more ambitious, more diverse, and more networked all over the world'. (Tengö et al., 2021, p. 4 citing Irwin 2018).

As an example, (Tengö et al., 2021) cite an Australian case, The Kimberley Indigenous Saltwater Science Project (KISSP), which was initiated in response to the implementation of a large, externally driven research project that sought to engage Indigenous people in producing scientific impact'. Citizen science, in the Indigenous Community context, is becoming increasingly viewed as a vital connection to sustainability

science. And while sustainability science is generally linked to ecological management projects, I would suggest that cultural and Traditional Knowledge sustainability of an Indigenous landscape is also a relevant issue to be researched.

2.10 Culturally Inclusive Science Education – a Rationale, Debatable Issues, Challenges and Ramifications

My intention with this section is provide for the reader a relevant context and theoretical basis for analysing the data pertinent to the school trials program, which formed an important parallel component of the original science books project. Teacher and student feedback was considered to be essential at the time for guidance of the book development.

I will commence this section by investigating the terminology used to represent culturally inclusive science education. 'Two-way' and 'both-ways' science is often found in the literature (Barbour & Schlesinger, 2012) or cross-cultural (Brennan et al., 2012). Two-Way science is defined as '… a pedagogy. It's an approach that connects the traditional ecological knowledge of Aboriginal people – that is the cultural understanding of people, animals and the environment – with Western science inquiry, and links that to the Australian Curriculum in a learning program' (ACARA, 2019, p.1). Recently a new term has emerged, 'right way science', with respect to developing cross-cultural knowledge (McKemey et al., 2021). The argument for 'right-way science' as the preferred term mirrors the process of working together with our Aboriginal partners because it avoids language suggesting there are only two ways ('two-way science') or that there must always be two ways. Bush Heritage Australia (2021) defines it as '…an approach based on respect, sharing knowledge, listening and learning. It brings together different knowledge systems for thinking, planning and acting for the benefit of people and Country'. For this study, however, I will remain with 'two-way', rationalising that I am researching the bridge connecting two knowledge domains, the Aboriginal World and Western Scientific. Simple as that.

I now want to explore the pertinent question, why should we as educators countenance culturally inclusive science education? What would be the rationale for its inclusion? Higgins (2021, p. v) offered one insight into a possible answer by proffering that 'Science education is increasingly being heralded as a remedy to a multiplicity of contemporary issues (e.g., scientific literacy). Science education is actively worked upon to be more accessible, inclusive and empowering. However, the ways in which science education takes up its responsibility in making itself accessible to all learners does not always come to value the ways-of-knowing and of being that diverge from the standard account of Western humanist thought (e.g., nature/culture as binary)'.

There is, however, a recent but growing movement within science education that calls for a move 'from empowerment to responsibility', a shift that is particularly significant for two reasons, as follows:

> Children and communities living under socio-spatial and environmental challenges are powerful individuals and collectives, they do not 'need' to be, per se, 'empowered' into dominant thinking or practices, but what we might need [are] powerful frameworks, which take into consideration and legitimise the diverse ways-of-knowing and of being, describing the natural cultural world among diverse sociocultural groups that are different from the dominant ways in which conventional science education understands and explains it. (Kayumova et al., 2019, p. 225, as cited in Higgins, 2021, pp. v–vi)

One might ask, do equality and equity pertain to social justice? According to Anthis (2020), not necessarily. Anthis (2020, p. 1) states that 'Social mobility refers to opportunities to achieve greater economic changes from one generation to the next', and 'Social justice is

often defined as the ability of people to reach their full potential within the societies in which they reside (citing Turiel et al., 2016). Russell (2015, p. 274) defines social justice as:

> …the ability of people to realize their potential in the context of the society in which they live. From a human developmental perspective, social justice is manifest when people have the support and opportunity to navigate society in ways that maximize their potential for growth, health, and happiness across the life course.

Anthis (2020, p. 1) answers the questions, 'What is social justice?', and 'Is equality the same thing as equity?' by elaborating further, 'Equality is often defined as an equal distribution of opportunities, such as everyone being provided with the same thing to ensure they achieve their best'; and 'Equity is often referred to as an equitable distribution of opportunities, such as everyone being provided with what they need to ensure they do their best'. She goes on to give a qualified conditional definition of social justice, 'Social justice requires that the systems which create and perpetuate inequities be restructured so that barriers to accessing tools and opportunities are eliminated'. Anthis (2020, p. 1) suggests that adhering to this principle of social justice will lead to equity, including the equitable distribution of opportunities, which then ensures that all citizens are provided with what they need to achieve their best. If we are to accept this social justice perspective as reasonable, then I would suggest that the status and quality of a child's formative years are of paramount importance to defining their life journey. The quality of a child's schooling, consequently, perhaps should necessarily be seen to play a significant component of that journey, including instruction in the sciences and science literacy.

At this point, it's appropriate to consider briefly why it is important for all students to achieve literacy in science. 'One of the most common rationales for advancing scientific

literacy is grounded in the widely supposed link between scientific literacy and national economic well-being'. (McConney et al., 2011, p. 2019). A scientifically literate citizenry, arguably, contributes to the economic health of a country based on the premise that a nation's economic well-being depends on its citizens becoming the scientists, engineers and technically skilled individuals appropriately equipped to successfully compete in the international marketplace (Hackling, 2001 & Laugksch, 2000, as cited in McConney et al., 2011, p. 2019).

Szostkowski and Upadhyay (2019) argue that social justice, morality and healing must be at the core of an equity agenda for science education. They (2019, p. 338) assert that 'As science education researchers, we believe that inequity in science education reflects larger patterns of educational inequality ...'. Bronfenbrenner (1973, p. 9) expounds upon the equality and equity duality:

> The terms equality and equity are widely confused. Despite their phonetic similarity and philological connections, they are quite distinct. The equality of a distribution of income or wealth is basically a matter of fact and is, therefore, basically objective. The equity of the same distribution is basically a matter of ethical judgement and is, therefore, basically subjective.

An Australian ethics-based debate can perhaps be best approached through Reconciliation Australia's policies and philosophical base, while the pragmatic approach is possibly done through exploring the concept of science capital.

Reflecting a growing public awareness, Reys and Chaney (2001), (as cited in Ma Rhea and Atkinson, 2012, p. 155), introduce us to a possible link between reconciliation and education in Australia,

> We at Reconciliation Australia … believe that education plays a crucial role in the reconciliation process … and educational aspects of reconciliation must go hand in hand with a strategic and determined effort to give substance to the word through tangible outcomes which make reconciliation a reality in our communities, workplaces, institutions and organisations.

Identifying the 'ethics' issue as it relates to the Australian situation has proved to be challenging. Reconciliation Australia (2016, p. 22) reports that 'Reconciliation is more likely to progress when Aboriginal, Torres Strait Islander and non-Indigenous Australians participate equally and equitably in all areas of life'. The report takes this further with, 'An education system that uses a cross-curriculum focus to foster respectful understanding of Aboriginal and Torres Strait Islander cultures and histories is crucial to becoming a reconciled nation. Maintaining and strengthening a strong curriculum focus on these areas is critical'.

Reconciliation Australia, however, makes no direct reference to 'ethics' in its 2016 report, but in one section reports on the duality – equality and equity – indirectly embracing the ethics issue. Two key findings of the report (2016, p. 34), pertinent to education, seem to support this: Aboriginal and Torres Strait Islander peoples enjoy less participation in, and access to, a range of life opportunities – significant disparities continue to exist in the key areas of employment, education and health, and Aboriginal and Torres Strait Islander people

are more likely to consider their living conditions worse than other peoples and are more likely to see barriers to employment and education.

Holbrook (2010, p. 83) cites the Melbourne Declaration on Educational Goals for Young Australians (2008) which explicitly states that active and informed citizens as students '…understand and acknowledge the value of Indigenous cultures and possess the knowledge, skills and understanding contributing to, and benefit from, reconciliation between Indigenous and non-Indigenous Australians…'.

Ma Rhea and Atkinson (2012, p. 162) suggest that incorporating Indigenous and Traditional Knowledge in the education system may be both complex and problematic, and point out that 'Equally problematic, the techniques of "good" Western science have not often been combined in a collaborative research partnership with knowledgeable Indigenous people, so the status of the 'Indigenous knowledge' is sometimes questionable'.

Ma Rhea and Langton (2003), (as cited in Ma Rhea & Atkinson, 2012, p. 163) 'pointed to the high status that many governments in the regions surveyed attach to Western scientific and technological knowledge because they perceive it to be important for capacity building in national education systems'. This preoccupation with Western ways of knowing however contrasts with 'the growing interest in Traditional Knowledge because of its potential contribution to global ecological sustainability and to minimising the West's pre-occupation with materialism', where the problem here however 'is to design a curriculum that achieves an appropriate balance between these two knowledge traditions'.

The literature that explores this question of rationality from an empirical, objective base, includes research work done in Australia by Lyons (2006). He found that students who went on to study post-compulsory physical sciences tended to have supportive parents or family members with favourable views towards science education, which demonstrates the

importance of cultural and social capital in the enrolment decisions of high achieving students.

Archer et al.'s (2015) research supports Lyons's findings. They advance a discussion using the concept 'science capital' to argue for an objective approach to rationalising culturally inclusive science education. Archer et al. (2014) (as cited in Archer et al. 2015, p. 922) refer to research which proposes science-related forms of cultural and cultural capital as a theoretical lens for explaining differential patterns of aspiration and educational participation among young people. Analysis of survey data found that science capital was unevenly spread across the student population.

> Analysis shows that levels of science capital (high, medium or low) are clearly patterned by cultural capital, gender, ethnicity and set (track) in science. Students with high, medium, or low levels of science capital also seem to have very different post-16 plans (regarding studying or working in science) and different levels of self-efficacy in science. They also vary dramatically in terms of whether they feel others see them as a 'science person (Archer et al., 2015, p. 922)'.

The import of these findings, by transferring and refocusing on a national perspective, is captured by Gorard and See (2009, p. 102). Their work on the patterns of science participation uncovered by their secondary analysis of the official datasets, states that 'In general … those who apply for (and also those who obtain places in) science subjects, and not just in the physical sciences, have a higher occupational class profile than the general student population (and probably even more so than the general resident population'. These results correlate well with Archer et al. (2015, p. 923) who assert that 'The imperative to improve (widen and increase) participation reflects both national economic concerns, namely,

to ensure a sufficient talent pool and supply of future scientists, and social justice concerns, to promote equity and ensure a scientifically literate general population who can be active citizens within a scientifically advanced contemporary society'.

Cruwys et al. (2013, p. 5) investigate the impact of socioeconomic status on participation and attainment in general education within the Australian Indigenous context. They report that:

> A number of factors that may have ostensibly been thought to increase an individual's opportunities, such as gaining a certificate or diploma or gaining part-time work, did not reduce the risk of these marginalised people exiting disadvantage over the decade of the study. This contrasts with gaining a tertiary degree or full-time paid work, both of which strongly reduced the risk of remaining marginalised. Thus, in terms of educational attainment, it does not appear true to say that any qualification is better than none. Nor was any job better than none.

The indicators for marginalisation are multi-dimensional. In recent years there has been an increasing focus on this multidimensional nature of disadvantage. Cruwys et al.'s findings are based on existing research that has suggested that disadvantage tends to be experienced in multiple domains simultaneously. The importance of education and employment in keeping households out of poverty was identified, also reflective of the emergence of policies to address human capital development (Sen, as cited in Cruwys et al. 2013, p. 8), and correlating well with Archer et al.'s (2015) research findings.

Cruwys et al. (2013, p. 17) reporting on the modifiable early-life predictors state that 'The proportion of those leaving school before the age of 16 was almost two times higher in the marginalised groups than in the never-marginalised group'. Further, Cruwys et al. (2013,

pp.16–17) found that those who had left school early were significantly more likely to remain marginalised, '… In 2001, marginalised individuals had lower levels of education than did non-marginalised Australians, with two-thirds (67%) having only completed high school or less'. While there was a positive change in educational attainment over the ten-year period, some had attained a university education by 2010. 'The impact of this action was profound: 95% of those who did (33 of the 35 people) had exited marginalisation. Obtaining a tertiary education was thus a strong predictor of exit from marginalisation'. But the authors emphasise that education cannot be considered a 'quick fix' for marginalisation.

It needs to be stated here that while science capital is a comprehensive concept that encompasses science literacy, it also includes other practices including what you do, who you know, and what your family values are, all within a science frame-of-reference. Science literacy includes science knowledge, associated skills, and an appreciation of science. McConney et al. (2011, p. 2017) report, also based on existing national based research data, (OECD, 2007) that 'Previous research has shown that Indigenous students in Australia do not enjoy equal educational outcomes with other Australians. This secondary analysis from PISA 2006, confirmed that this continues to be the case in science literacy for secondary students'. While their observation from the OECD (2007) report is supported by those of Cruwys et al.'s (2013) in a broad educational context, McConney et al. (2011, p. 2017) find, however, that the analysis also revealed that '…Indigenous Australian students held interest in science equal to that of their non-Indigenous peers, and that observed variations in science literacy performance were most strongly explained by variations in reading literacy'.

McConney et al. (2011, p. 2031) acknowledge the task behind addressing these issues and suggest that 'In addition to efforts aimed at improving what happens between teachers and students in classrooms doing science, it is also clear that policymakers and science

education researchers have important contributions to make'. McConney et al. (2011, p. 2033) conclude their paper by offering practical suggestions within four interrelated communities of practice and research: teachers and intending teachers, teacher educators, researchers, and policymakers, that are aimed at '…maintaining the press to close the gap in science literacy and education generally?' They end their paper with questions that seem important for further research, questions which relate for example to compensating for the remoteness of some Indigenous students through internet access and recognising the possible impact upon Indigenous students learning and being assessed in science through a second language.

Higgins (2014, p. 154) reports that 'Within Canadian science classrooms, Indigenous ways-of-knowing and ways-of-being continue to be underrepresented and undervalued. For Indigenous students, this often results in negative experiences and disparate achievement rates when compared to their non-Indigenous classmates'. Michie (2002, p. 36) presents an argument for including Indigenous Science in the School Science Curriculum. He begins by pointing out that much writing has primarily focused on how to engage in teaching Indigenous Science. Michie then proceeds to provide a rationale for why we should be teaching Indigenous science. He begins by exploring the question of 'what Indigenous Science tells me about Western Science and science education'. This he answers in part by relating to Aboriginal anecdotal evidence for the long-recognised link between Aboriginal people and their obligations, exercised through traditional lore and customary procedures, to animal and plant management practises such as patchwork burning regimes.

Michie (2002, p. 38) then queries the popularly perceived role of science education in communicating science, by citing C. P. Snow's (1959) idea that science and education should be considered in opposite camps, with the implication that science education is situated as a

bridge between ‘The Two Cultures’. This he suggests implies that Aikenhead’s (1997) vision of cultural brokers may support a science–technology–society approach. It may be appropriate here to perhaps consider the increasing evidence that science educators are recognising that both Western science and Indigenous knowledge have a cultural basis; hence it is appropriate for any contemporary, comparative discourse to express their respective cultural foundations. The assertion by Chalmers (2013, p. 220), that ‘The enduring part of science is that part which is based on observation and experiment’, could draw common ground between Western Modern Science and Indigenous Knowledge Systems.

There are science educators who, conversely, believe that defining Indigenous Knowledge (IK) as a science will be to IK’s detriment. There is support for the compatibility, however, of these two knowledge systems (Stephens, 2003) comparing IK with WS. Also, while the significant cultural differences are acknowledged, the important aspect of the significant ‘common ground” is recognised. (Aikenhead & Ogawa 2007; Cobern & Loving, 2001). Monhardt’s (2003) study challenged the perception that science and IKS are innately and distinctly different knowledge domains. The Navajo students’ views on ‘scientists’ and ‘science’ were described as ‘non-stereotypical’, using their own cultural frameworks to understand a science concept. An important finding was the strong link between their concept of science and ‘place’. Their concept of a scientist was one who worked ‘outdoors’.

Furthermore, there is wide agreement among educators that all knowledge has Indigenous origins (e.g., Aikenhead 2001; Castagno & Brayboy 2008; El-Hani & Bandeira 2008; Higgins 2011; McMillan 2013; Ninnes 2000). Michie (2002, p. 38) presents a further dimension to his argument by posing the question, ‘What does science have to do with reconciliation?’ Michie goes on to arguing a case for culturally inclusive science education

serving as a means for achieving reconciliation between Indigenous and non-Indigenous peoples and as a vehicle for social justice.

Recent literature reveals a growing awareness of, and debate around, ethics and science education, and that there is more than one approach tackling the issue. Bazzul (2016, p. 23) opines that 'Science and science education are entangled with a wide range of ethical contexts ranging from the sharing of information and reporting, falsification/validation of data, use of animals, to the public return on investment'. He argues that 'engaging ethics in science education should take a variety of useful forms'. He suggests that educators 'can also critically examine both the topics and modes of ethical engagement "on offer" to students'. He concludes his work by suggesting a list of what science educators and educational scholars can do to shift the field toward more ethically and politically engaged practices, toward a transdisciplinary, politically engaged science education. Bazzul (2016, p. 66) suggests a 'Focus on the Socio-political – Make socio-political concerns such as racial inequality, economic exploitation, and the destruction of Earth's diversity the focus of science education pedagogy, curriculum, and research'.

In closing this section, I strongly suggest that the disadvantaged students and their families are the ones who should be listened to. As Creswell (2012, p. 531) points out, 'Attention to the narratives of students and their families is a reminder not to lose sight of the diversity in student populations and highlights the need for attention to issues of social justice and equity in education'. Highlighting this awareness at both State and National levels should be seen as an imperative, and can be tackled in part by developing an argument for a cohesive and universal policy for Indigenous knowledge inclusion in science education. This can be broached and rationalised from four conceptual directions: social justice, equality, equity and economic rationalism (Ninnes, 2004; Todd, 2018; Zipin et al., 2015)

2.11 Evidence for Culturally Inclusive Science Education

Michie (2002) acknowledges, with respect to teaching Indigenous Science in the classroom, the lack of resource materials teachers can use and a lack of appropriate professional development. He notes that the situation had improved slightly (e.g., Halling, 1999; Rose & Read, 2001) but further resource materials need to be produced. Case studies reveal where science education materials sensitively used the local Indigenous language, leading to observed improvement in student attitudes to both learning and their Indigenous culture (McKinley, 2005; Morales, 2015; Usborne, 2011). There is a call for schools to be seen in cultural terms, as being 'real' (Kuiper, 1998). Kuiper (1998, p. 21) addresses the need for science educators to '…generate learning by situating science concepts and ideas for the learner [in] familiar context'. Further, there is an emerging framework where the community is regarded as 'first' (Mutonyi, 2016), as evidenced by the *Bridging Cultures* textbook in Saskatchewan (McGregor, 2012). Science can be seen as a cultural enterprise, with an evolving discourse about science education and IKS (Marker, 2015).

As a lead-in to the following section, I would argue that Citizen Science ought to be regarded as a practical means for 'bridging cultures', within a scientific setting. And, as an extension, be seen as a practical method for introducing culturally inclusive science education, not necessarily in a formal sense, but through Community involvement and association.

2.12 The Challenges and Some Insights for the Future

The challenges facing educators who wish to introduce culturally inclusive science curricula are significant. Fensham (2002) (as cited in Aikenhead, 1996, p. 39) warns that the science curriculum is a social instrument that serves the interests of those who have a stake in its content. The first interest group includes influential stakeholders who simply want school

science to act as society's screening device to maintain an intellectual, social elite. The second group represents the marginalised social groups whose students can effectively be screened out by school science, thereby denying them the higher status and power afforded by science-related professions.

Science educators are recognising that both Western science and Indigenous knowledge are culturally based, and that it is appropriate for any contemporary discourse in science education to express their cultural foundations. The belief is decreasing that incorporating Indigenous knowledge as a science would be to its detriment: science is seen as evolving. While there are significant cultural differences between IK and WS, when compared and contrasted, the interesting and positive aspect is the significant common ground between these two fields of knowledge (Aikenhead & Ogawa, 2007; Cobern & Loving, 2001; Stephens, 2003).

Any opening on educational matters pertaining to science might quite properly look at the epistemology, particularly that associated with secondary-level schooling, the student body, the curricula and the pedagogy. By applying an epistemological lens to a culturally inclusive science curriculum, we can consider the theories behind knowledge acquisition. An appropriate theory is constructivism, which presupposes that all knowledge is 'constructed', in that it is contingent on convention, human perception and social experience. In other words, constructivism is culture friendly.

In recognising science, and therefore science education, as being culturally embedded, it follows that student construction of new knowledge will involve interpretation influenced by prior knowledge, including knowledge that is culturally based. Thus, it is reasonable to expect that science education, through the inclusion of Indigenous culture and knowledge, will better connect science to Indigenous students' lives (Castagno & Brayboy , 2008;

Cobern, 1996a). I am aware of the educational challenges facing Indigenous students in the majority Indigenous communities in Australia. These concerning issues have been extensively and sensitively researched and expressed by prominent international scholars. They seek to redress the imbalance between the influential elite and the socially marginalised, with the focus on the Indigenous student. (e.g., Aikenhead (1996), Kawagley and Bernhardt (2005), Castagno and Brayboy (2008), Ogunniyi (2015), and Aikenhead and Ogawa (2007)).

My focus, for the purposes of this study, is on the secondary science student attending schools in the broader Australian community. A culturally inclusive science curriculum available for the majority student body, both Indigenous and non- Indigenous, would require a supportive, bipartisan socio-political will in Australia. In the first instance, it would require that the science teacher as one of the influential stakeholders, '…would play the role of 'tour guide' taking students across the [cultural] border and directing their science in the direction of the students' everyday world (Aikenhead, 1996, p. 26)'. For this to happen of course would require the teacher to act as an emissary for the prevailing socio-political norms. The research indicates that this applies equally to Australia and internationally.

When I was preparing for the preliminary phase of my original research and development for the science book project, while framing and scoping the content and context, I initially planned the textbook specifically for the Indigenous students undertaking the Australian national science curriculum. During early discussions with two key Aboriginal Elders, both Traditional Owners, however, I was very quickly corrected, and advised that the book was for all students, 'black and white'. Their logic was simply, 'We are all under the same umbrella, and we can learn from each other'. Jack, my facilitator–liaison person, at the 'Top-End' community, qualified this further by pointing out that 'The "Balander" students were more likely to become the future politicians and lawyers'. Jack was an astute and very

wise fellow, a pragmatist who recognised the power and political plays at work in his Top-End community, hence his recognition of the relevance of the book to all Australian secondary students.

While culturally inclusive science education research applies to all levels of schooling, the focus for this study is on years nine and ten, at the middle secondary school level, and within the broader Australian community, where the science curriculum conforms to the Australian Curriculum standard. As a matter of course, reference will need to be made to articles and research applying to all the levels of schooling where there is cross relevance to the secondary level.

2.13 Science Textbooks, Degrees of Indigenous Knowledge Inclusiveness and Other Issues

Important Indigenous feedback on how Indigenous culture ought to be represented in a textbook is revealed in the Review of the Australian Curriculum (2014), with a section on recorded suggestions for pedagogic change, included in part with reference to Indigenous culture. The Review (2014, p. 137) suggests for '…the simple abolition of the cross-curriculum priorities either because their selection was biased, or because they had no educational foundation, or they were not appropriate to one or another discipline area', where Indigenous educators argued that

> …an appreciation of Indigenous culture and history was far too important to be simply treated as a cross-curriculum theme and would result in superficial and uneven teaching of subject matter that rightly belonged in relevant disciplines or preferably as a standalone subject taught by a teacher qualified in the area. … but rather should be 'structured, unitized and taught by professionals.

While the Australian educational perspective is reflected by The Shape of the Australian Curriculum Science Statement (2009, p. 10), one could argue that it suggests a token, superficial level of Aboriginal cultural inclusiveness as is indicated by the statement that 'The Australian science curriculum will provide opportunities for students to develop understanding of aspects of Indigenous cultures'.

But the intention is clear: there needs to be a representation of Indigenous knowledge within the Australian Curriculum, in each knowledge field. The Melbourne Declaration (as cited in The Review of the Australian Curriculum – final report, 2014, p. 62) argues that

> While … all students have the right to study what are described as the 'fundamental disciplines' the Declaration also emphasises the importance of general capabilities, inter-disciplinary approaches and the need to deal with sustainability and Indigenous content.

If we can assume that science textbooks will normally reflect the Australian curriculum standards, then more recent feedback on Aboriginal cultural inclusiveness is revealed in the Final Report (2014) of the Review of the Australian Curriculum. The Final Report (2014, p. 180) indicates a general concern that the curriculum approach was somewhat contrived and tokenistic in far too many instances. The suggestions for change referred, in part, to the 'embedding' of 'Indigenous aspects' in the science curriculum. The recommendation for a cross-curriculum priority was seen as problematic because of perceived bias, lacking educational foundation, or not being appropriate to science.

The Final Report (2014, p. 137) reports however, that some Indigenous educators argued that Indigenous perspectives should not be a cross-curriculum priority but rather should be 'structured, unitised and taught by professionals', because Indigenous culture was regarded as being too important to be simply treated as a cross-curriculum theme. The above

concerns were echoed by independent research on how IKS has been contextualised in mainstream secondary school science textbooks. The call for 'decolonising' textbooks was unequivocal, as was the call for education authorities to assist this approach (Ninnes, 2000, 2001). Ninnes (2001, p. 26) was unequivocal in his recommendation for 'decolonising' textbooks, 'But perhaps most importantly, given the findings of this study, a truly post-colonial approach to science education, and hence science textbooks, can be greatly assisted by ministries of education developing syllabuses and curriculums that take this approach'.

Ninnes analysed a sample of Canadian and Australian science textbooks, which attempt to incorporate greater diversity of knowledge types (2000, p. 603). A comparison of texts developed in Australia and Canada is pertinent since both are predominantly European settler societies with small and socio-economically marginalised Indigenous minorities. Ninnes (2000, p. 612) found that the texts tended to use terms that suggested homogenous practises or identities among Indigenous people, hence '…masking diversity among Indigenous populations'. To date, Ninnes' recommendations have not been heeded.

Problematic also was the use of the term 'traditional' to prescribe notions of authenticity to Indigenous identities, which represents a form of cultural imperialism. His final concern lay with the nature of the Indigenous knowledge used, and to the extent to which the authors had obtained permission for its use. Ninnes (2001, p. 23) surveyed the authors of the above texts. He found that authors were constrained by '…their own lack of knowledge about Indigenous issues and perspectives and how to apply them in teaching of science concepts'.

Kim and Dionne (2014, p. 234) provide further support for cultural inclusiveness in textbooks, stating that 'With a national mandate, there is a need for more ministerial initiatives to provide a better progression of the learning outcomes (i.e., learning

expectations) that are related to TEK, especially for jurisdictions in clusters 1 and 2. Further provincial/territorial development in the learning outcomes with in-depth examples related to TEK would allow publishers to have clearer guidelines while incorporating TEK into textbooks and teachers to have more incentives to incorporate TEK in their lessons'.

Some dominant determiners of science textbook content are the curricular requirements decided by provincial and state educational authorities. (Ninnes 2000, 2001; Jogie, 2015). It is perhaps pertinent here to mention that science is not the only educational field confronted by multi-cultural issues. Jogie (2015) analysed a sample of secondary English texts from England and Australia. The two countries were chosen because of the similarities between the respective curriculum authorities. Jogie (2015, p. 306) proposes that 'More contemporary text options on prescribed reading lists will enable students from diverse backgrounds to engage in discussions of cultural identities in a world of increasing globalisation. Teacher preparedness for tackling culturally inclusive text was also an issue in Jogie's (2015, p. 294) study, where 'Both Australian and British Curriculum Officers advised that new cultural texts were difficult to add to the prescribed reading list, because of the apparent lack of critical material or training available for teachers to confidently teach these texts'.

While there remains no consensus, however, either internationally or in Australia, on bridging science and Indigenous knowledge (Aikenhead & Cobern, 1998; Kim & Dionne, 2014; Snively & Corsiglia, 2001), the literature does contain recent examples of educational authorities developing a decolonising syllabus and culturally diverse curriculum. In Canada, particularly in the majority Nunavut communities, there have been recent moves for 'ministerial initiatives' to facilitate the progression of Traditional Environmental Knowledge (TEK). Kim and Dionne (2014) reveal that this would in turn encourage publishers to

incorporate TEK into textbooks, thus providing more incentive for teachers to incorporate TEK into their lessons. Third World countries such as Namibia have not included Indigenous knowledge (IK) in their recently developed national curricula (Matemba & Lilemba, 2015); and surveys of regional and state educational institutions revealing that IKS has been discounted or disregarded, even where newly published and freely available culturally inclusive science textbooks have been released, usage has been constrained through a lack of political will.

But in terms of the mainstream school setting, we have contradictory cases such as with the seminal Canadian text *Bridging Cultures: Indigenous and Scientific Ways of Knowing* (Aikenhead & Michell, 2011), which gives due recognition to Indigenous knowledge as an important and legitimate source of understanding of the physical world. It is a resource for science teachers considering introducing Indigenous knowledge into the science curriculum in mainstream education, which provides an alternative approach to the Western ideas about holding power over nature. They propose a set of 'Indigenous ways of living in nature' (IWLN), which are place based, monist, holistic, rational, mysterious, dynamic, systematically empirical, based on cyclical time, and both rational and spiritual. The lack of implementation of this textbook, however, is indicative of the larger Canadian perspective, which is not supportive of cultural integration (McGregor, 2012). McGregor's (2012, p. 309) comments 'Overall, taken as a whole, the book does serve as a fantastic resource for educators for the consideration of IWLN in science curriculum in mainstream education'.

McGregor concedes the frustrations behind developing such bi-cultural texts, '…we continue to live and work in a larger Canadian context that does not support the integration of IWLN' (2012, p. 309), but he is openly critical of what he sees as its main shortcoming, that

‘The broader, more political aspect of mainstream education and Indigenous education is not adequately addressed in the book’. McGregor’s complaint is understandable, and his opinion is most likely appreciated by Aikenhead and Mitchell (2011), especially given the comparison with the Nunavut case (Kim & Dionne, 2014) cited above. We have, in essence, the difference in perceived attitudes and values revealed between two dissimilar communities, one in the more populated ‘mainstream’ and the other in a remote Indigenous community.

While there remains, however, no consensus on science and Indigenous knowledge (Aikenhead & Cobern, 1998; Kim, 2014; Ogawa, 1999; Snively & Corsiglia, 2001), the literature does contain recent examples of educational authorities developing a decolonising syllabus and curriculum. McMillan (2013) reports on the development of a science unit for indigenous students in the Nunavut Territory. The science unit addresses the requirements of the Canadian Common Framework of Science Learning Outcomes K-12. The unit was a cooperative effort between the local community, territory educational authority and government for bi-cultural science education, and targets three schools in the kindergarten to junior secondary range. At time of writing, the science curriculum had not been written.

McMillan (2013, p. 143) found that teachers expressing discomfort with including Indigenous perspectives in their subject area were told ‘…most elementary teachers have no difficulty planning units of study about Japan and Ancient Egypt, so why would a study of Aboriginal peoples be any different? “Just do it”’. These concerns are shared by Manzini (2000, p. 19), Western trained in physical science, when recognising the challenges behind teaching culturally inclusive science, ‘Demarcation is itself problematic since it is foreign to the manner in which life is experienced’.

Kim and Dionne's (2014) study, which explores the status of traditional ecological knowledge (TEK) in provincial junior secondary science curricula, revealed a high variation in the prevalence and representations of TEK. Aikenhead (as cited in Kim & Dionne, 2014, p. 313) found that 'TEK provides a culturally relevant science curriculum for Aboriginal students in particular, which effectively engages them in school science, resulting in greater achievement rates for these students in the fields of sciences and technology'. Furthermore, Kim and Dionne (2014, p. 316) refer to specifically collected Indigenous Knowledge that parallels Western Modern Science (WMS), citing Simpson (2001). Aikenhead and Mitchell, Snively and Corsiglia (as cited in Kim and Dionne, 2014, p. 316) also contend that '…worldviews and knowledge found within IS are integrated with Eurocentric ecology; in this way, TEK shares numerous similarities with WMS'.

The evidence in Australia and internationally, therefore, is that there is still room for improvement towards decolonising curricula and textbooks. To achieve greater cultural diversity, Ninnes (2001, p. 26) concludes '… most importantly, given the findings of this study, a truly post-colonial approach to science education, and hence science textbooks, can be greatly assisted by ministries of education developing syllabuses and curriculums that take this approach'. An example of this occurred in Canada, where the seminal Canadian text, *Bridging Cultures* by Aikenhead and Michell (2011) was released. With reference to the mainstream curriculum, McGregor (2012, p. 310) concludes 'This book serves as an excellent resource for an innovative, more inclusive, culturally responsive approach to science education for any educator'. McGregor (2012, p. 309) also supports Ninnes' (2000, 2001) argument that science teachers need to recognise and address the fact that despite the progress that has been made, they continue to live and work in a larger Canadian context that does not support the integration of Indigenous knowledge.

Concluding this section perhaps on a positive note, when we consider the similarities and differences between the two systems, Kim and Dionne (2014, p. 316) propose that WMS and TEK can be used synergistically to deliver a holistic science curriculum. Rioux's (2015) thesis, 'Two Way Strong', appears pertinent to Indigenous knowledge inclusiveness in a secondary science program. Rioux completed his original research work in Central Queensland. His study (2015, p. iii) explores the effectiveness of the Montessori Method in teaching zoology to year 8–9 students in an Indigenous independent high school in Queensland and develops a theory that explains the impact of the approach on their learning about vertebrates. Specifically, it examines the process of merging local Indigenous knowledge into the Montessori zoology curriculum (non-Indigenous) to produce localised, Indigenised, and contextualised teaching/learning materials. Rioux (2015, p. 353) concludes in part, that publicising the existence of local narratives is worth investigating because so much is lost from local Indigenous heritage that could inform true development of local Indigenous pedagogy, Indigenous epistemology, ontology and axiology.

In conclusion, it is clear that contemporary school science textbooks remain deeply inadequate in representing Indigenous knowledges. This applies both in Australia and internationally.

2.14 Pedagogical Practices – a Theoretical Perspective to Cultural Inclusion

The Contiguous Articulation Theory (CAT), dialogic argumentation instructional model (DIAM), and cross-cultural border crossings are all widely referred to in the research literature (Aikenhead, 1996; Ogunniyi, 1996, 2000, 2007a, 2007b). All three models refer to pedagogical strategies available to teachers and students to facilitate their personal educational journeys from one cultural mindset to another. In the context of science education where teaching and learning bridge Indigenous Traditional Knowledge with Western Science,

the CAT and DAIM procedures become an essential component to balanced and equitable learning of alternative cultural views on natural phenomena. This scenario applies equally to all school settings, from schools described as rural, where the students are predominantly Indigenous, and their first language is different to that used as the instructional medium, to schools in urban areas where there is essentially one language used – the majority language.

Kim and Dionne (2014, p. 325) referring to culturally embracing in-school and out-of-school activities, state that 'Such pedagogies would allow students to see TEK as a modern and progressive knowledge system that is relevant to their daily lives and would give teachers opportunities to connect their lessons with teachings from Elders, therefore providing more accurate in-depth knowledge'. The challenges in educating Indigenous students are evident with references to the demarcation between the life world of the student and the Western embedded educational system (Manzini, 2013). Research by Chigeza (2008) however, suggests a constructivist and context-based approaches to learning, focusing on the students' everyday oral and written languages. This will, it is argued, assist Indigenous students in crossing the cultural boundary by constructing new meaning and understanding, and will encourage them to talk about science in their local language and in English.

2.14.1 Cross-cultural Border Crossing

The cognitive experience of cultural border crossing is captured by the theory of collateral learning (Jegede, 1995). Aikenhead (1996) initially expounds his theory on cultural border crossings, where the teacher adopts the roles of 'travel adviser' and 'cultural broker'. Aikenhead has done seminal work within the culturally inclusive science curriculum. His (1996) article introduces and reconceptualises a cultural perspective for science, by introducing the concept of inherent border crossings between students' life world sub-cultures and the sub-culture of science. The concept should not be seen as one directional, but

rather as allowing for an open-minded approach, fostering understanding in all directions. Aikenhead's (1996) work has significantly shaped future research (Aikenhead & Elliot 2010; Bechtel, 2014; Higgins, 2011; Ryan, 2008).

Bechtel (2014, p. 7) attempts to mitigate the border crossings between scientific cultures, seeing this as a difficult task, and notes, 'A common concern for science education is that it is difficult to incorporate Indigenous knowledge into a Eurocentric setting'. Bechtel (2014, p. 21) describes the border crossing as 'a means to allow two distinct cultures to work with each other without allowing the differences between them to create turbulence that is difficult to mitigate'. He further recommends (2014, p. 22) that 'The concept of border crossing should not be considered one directional; rather, it should be conceived as a concept which allows for an open-minded approach that helps foster understanding in all directions'.

2.14.2 Collateral Learning, CAT and DAIM

The theoretical basis for the CAT and DAIM models were derived from Toulmin's (1969) model of argumentation. Weber et al. (2008, p. 248, citing Krummheuer, 1995; Rasmussen & Stephan, 2014), argue that Toulmin's (1969) model of argumentation can be a useful analytical tool for understanding the progression of students' arguments during collective discourse. Just how the argumentation process brings about change in people's perceptions and value orientations is not fully known, but there is substantial evidence in the present literature to show that it plays a vital role in the process (Leitao, as cited in Ogunniyi, 2015, p. 29). Ogunniyi's (2015, p. 20) paper explains how a '…dialogical argumentation instructional model (DAIM) was used as a tool to harness the potential of STM education into a liberatory pedagogy which increased the participants' awareness about the educational and cultural values of Indigenous knowledge as well as empowered them to develop a sense of sociocultural identity'.

Collateral learning (Jegede, 1995) also maintains a strong presence among scholars studying the theorisation of inclusion of IKS in school curricula. (Aikenhead, 1996, 2001, 2002; Aikenhead & Elliott 2010; Aikenhead & Jegede, 1999; Aikenhead & Ogawa 2007; Brand & Glasson, 2004; Cobern & Aikenhead, 1997; Cobern & Aikenhead, 1998; Dziva et al., 2012; Gondwe & Longneck, 2014; Mutonyi, 2016; Afonso Nhalevilo, 2012). Aikenhead and Jegede (1999) explain the concepts of Cultural Border Crossings and the related concept of Collateral Learning.

Aikenhead (1996) refers to the strategy known as Fatima's Rules as a justification for the culture border crossing strategy. He explains this as a means by which some students manage to learn and accommodate cultural concepts that are foreign to their worldview. It is an understandable coping strategy by students who feel their teacher is attempting to assimilate them into the culture of science and who want to resist such indoctrination. Fatima's Rules illustrates an important failure of traditional science curricula.

Aikenhead and Elliot (2010) case study their research into the effectiveness of cross-cultural border crossings and collateral learning in schools, citing positive results. Case studies where cross-cultural border-crossing strategies are used with success are given for Greek (Piliouras & Evangelou, 2010), Ecuadorian (Veintie, 2013), African (Afonso Nhalevilo, 2012) and Taiwanese (Chang et al., 2009) educational settings. The major thrust, however, for Contiguous Argumentation Theory programs has come from Ogunniyi (2000, 2004, 2007).

It was realised that teachers needed to understand their own worldview as a precursor to them engaging in cross-cultural science teaching (Walker, 2004), and that they needed training to implement the CAT program (Ogunniyi, 2004, 2007a; Ogunniyi & Hewson, 2008). An added dimension to CAT is the Dialogical Argumentation Implementation Method

(DAIM). That DAIM improves levels of effective dialogue in science class and develops a third space is supported (Kwofie & Ogunniyi, 2011). The case for Argumentation improving student skills and assisting the indigenising of school science is supported (Moyo, 2014; Okumus & Unal, 2012). Instances of science units being taught, using DAIM with positive results, are case studied (Diwu, 2010; Magerman, 2011)

The CAT, DAIM and Border Crossing models are relevant to this study. In preparation for the 'trial' phase of the Kormilda Science Project, the designated 'trial' teachers devised their own teaching strategies autonomously. So, a variety of approaches were undertaken, each best suited to local conditions and addressing the perceived local teaching and learning needs.

It was felt that there was more to be learnt pedagogically this way than by advocating a standard approach. It was also anticipated that 'Necessity is the mother of invention' would hold true, where each 'trial' teacher sensing the need for the all-important essential teaching approach felt strongly motivated to finding ways of achieving it. Interestingly the teachers, independently of each other, applied dialogic argumentation type methods as a matter of course, and generally with good results. The results from several of the 'trial' schools formed part of the Teacher Guide section, advising future science teachers on how to introduce the culturally loaded content to their classes.

The challenges in educating Indigenous students are evident with references to the demarcation between the life world of the student and the Western embedded educational system (Manzini, 2013). Research, however, suggests a constructivist and context-based approaches to learning, focusing on the students' everyday oral and written languages. This will, it is argued, assist Indigenous students in crossing the cultural boundary by constructing new meaning and understanding, and will encourage them to talk about science in their local

language and in English (Chigeza, 2008). Chigeza and Jackson (2012) highlight the socially negotiated and embedded nature of meaning-making, how one's culture influences how an individual or a group can make primary sense of their world.

Moje et al. (2004) point out that in a 'funds of knowledge' approach where, 'science teaching leverages scientific and mathematical practices (e.g., mechanics, construction, gardening, etc.) commonly found among low-income communities, though these practices are not formally recognised as "scientific" or "mathematical" among scientific communities and/or in science classrooms' (as cited in Tolbert, 2015, p. 1328). Chinn (2012) and George (2013) cite science education research which 'has demonstrated that professional development experiences can have an impact on teachers' capacity to re-evaluate the cultural relevance of their lessons, and their willingness to view their students' funds of knowledge as important contributions in science classrooms' (as cited in Tolbert 2015, p. 1328).

Moje et al. (2004, p. 56) imply a link between funds of knowledge and science literacy when posing the question 'How might strong ethnic identity and Discourses of social activism serve as funds for scientific literacy learning?' Martin (2007) (as cited in Chigeza & Jackson, 2012, p. 5) suggests increasing teaching effectiveness of maths and science to Indigenous students 'they should be able to teach the concepts in the subjects in ways that are 'relevant and responsive to social realities and cultural identities'. To enable learners to develop agency, those who support learning have to recognise the funds of knowledge drawn on by learners, and create hybrid pedagogical spaces, where points of intersection between these and institutional practices and values are enabled (Hicks, 2001, p. 225).

2.15 Concluding Comments

This chapter provides a theoretical background to the original exploratory and developmental fieldwork that formed the primary grounding and basis for this current

research study. I should note for the reader that Chapter Two's shorter length represents a fair estimate of the challenge faced by this researcher in interpreting and predicting an accurate theoretical base for this research study. I have found it difficult, given its inductive nature, to adequately conjure up thoughts around a potential theoretical framework.

Chapter Two essentially outlines a possible but limited theoretical framework for the transfer of Indigenous knowledge as part of an educational process that in the first instance involves the community as a starting point and then progresses to the school setting where dissemination of the Indigenous material to the student occurs. The rationale for this knowledge transfer was discussed in terms of a social justice context that embraces equity and equality issues. Furthermore, Indigenous knowledge is discussed as a subset of the cultural landscape, and engaged with through the processes of translation and transposition.

The debate and discourse among scholars contain many references to development of culturally inclusive science education curricula in numerous parts of the world, including Africa, North and South America, New Zealand, and Hawaii. The majority of this work has been done in predominantly Indigenous communities. A much smaller number of cases studied have application to the broader community context. However, with regard to the development and production of appropriate, culturally inclusive science curriculum materials, especially in the broader community school setting, there is a dearth of examples. For example, there is very little evidence of stand-alone units of secondary work with an Indigenous cultural content. Aikenhead and Mitchell's (2009) book, while of note here, is necessarily limited by its application as a teacher's guide. As Ninnes (2000, 2001) has noted, progress for the inclusion of Indigenous culture in science textbooks, while complying with the regulatory governmental guidelines, has been problematic.

The next chapter outlines the methodology, research design and methods utilised for the current study, chosen to best answer its research questions. While the methodology chosen is an autoethnography, it is essentially an overarching methodology because the research design uses a mixed method approach that draws upon both qualitative and quantitative elements. The quantitative element is founded upon, and drawn from, a series of Microsoft Excel spreadsheets that are used in part to first identify, and then quantify by simple frequency counts, the pertinent themes and categories being analysed for when searching for interesting patterns of behaviour and interpersonal interaction within the Communities. The reader will engage further with these adopted thematic analytic techniques in Chapter three. The autoethnography, also used as method, adopts an evocative, narrative approach designed to draw out and demonstrate the subtleties, nuances and intrigues associated with social interaction behaviour and circumstance that are woven throughout the story behind the original community field research journey. Complementing the autoethnography is a qualitative component – a thematic analysis – which utilises a more objective and structured method to reveal those patterns and consistencies of behaviour that relate to the interpersonal engagement with the participants drawn from the three Aboriginal Communities.

3. Chapter Three
Methodological Approach

3.1 Introduction

As outlined in Chapter One, Section 1.5.4, ‘different voices’ will be utilised in Chapter Three. I will be building on this concept by utilising it as a methodological tool when explaining the method for qualitatively researching the data (diary entries and field notes). The research methodology for this study is a qualitative autoethnography employing thematic analysis as its method. Chapter Three will explain the research design, methodology and methods adopted for this research study of those social interactions, verbal exchanges and situational dynamics that occurred during the development of the Earth Science Book Project, spanning a ten-year period. Application of an autoethnographic approach as both methodology and method (Gannon, 2017), coupled with a thematic analysis of the data, provides for a comprehensive observation of the social dynamics between Self and the Others in each of the three involved Aboriginal communities.

This chapter details the frequency of community visits (1992 to 2002), then provides a rationale for the study. This is followed by details of the research setting, related to Community and Country. Consideration is then given to the ontological, epistemological and axiological elements pertinent to this study, all projected within the perspective of the chosen research design. I will conclude this chapter by advocating for a mixed method approach, comprising a combined evocative autoethnography with a thematic analysis (Winkler, 2018), which together provide the most appropriate vehicle for delivering optimal outcomes for the findings through responding to the major question.

3.2 Research Context

Within this section I will provide details relating to my professional background, the timelines associated with the original study and community visits, the rationale behind this current research, the underlying research questions, and the research settings.

3.2.1 Background to the Study

To assist the reader with this story I think it pertinent to contextualise Chapter Three by providing a brief overview of my background, and the reasons for undertaking this study. As a retired secondary science teacher of Celtic Anglo-Saxon ancestry, my enduring passion has been to explore opportunities for promoting the very best for my students. And by extension, this applies to all Australian students, because I believe that a passion to educate children should not be bounded by one classroom or one school. In 1992, I taught in Darwin, including teaching maths and general science to a year nine class. These 25 students were from several remote Aboriginal communities from across the Northern Territory. English was often their third or fourth language, and intriguingly, I found them to be bright, bubbly and enthusiastic teenagers. They were keen to learn, and they were my first ever contact with Aboriginal Australia. Within weeks, I had envisioned a plan to research and develop an Earth Science unit that provided a dual perspective of the Australian landscape.

This current research explores the intrigues, challenges and dynamics involved in the evolving development of those all-important interpersonal and social relationships with the participants within each of the three diverse communities involved. The overall timeline for this project spanned ten years.

Figure 3.1 Timeline for Data Collection for Original Book Project

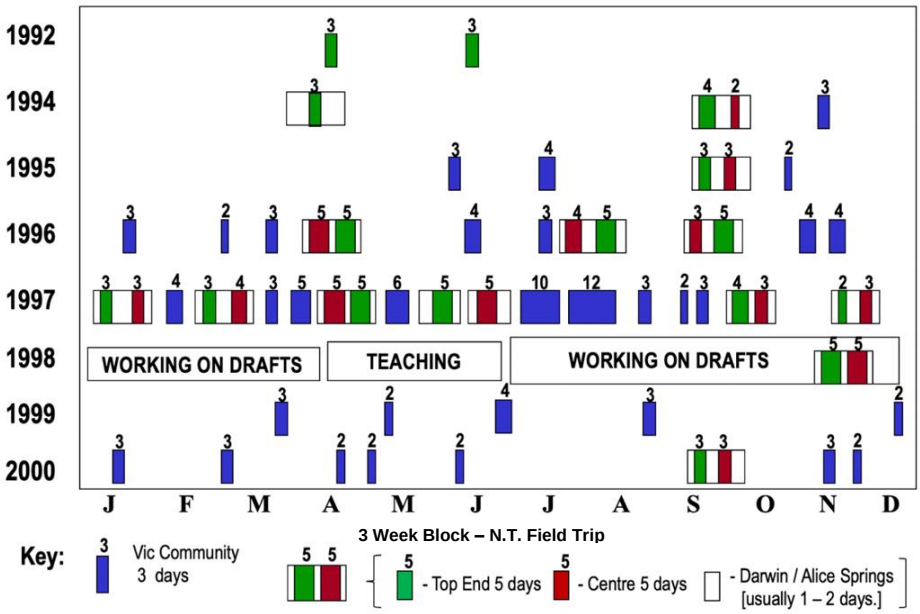
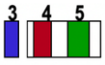


Figure 3.1 shows the two timelines (by year in the vertical, and by month for the school year along the horizontal) relevant to the original research. The horizontal axis represents a school year, in keeping with standard teacher journal layouts. To assist the reader, have used colour coded blocks to indicate what community I was working in, and when. The large three-week blocks in years 1994 to 1996 included the end of term vacations. This representative section from 1996,  indicates a long weekend (3 days) spent in the Southern community followed shortly after by a three-week block in the Northern Territory, with four days in the Centre community and five days in the Top-End community.

As the reader will notice, there was an almost exponential increase in the number of days on task in the communities from 1994 to 1998. During the 1994 to 1996 period, my Northern Territory community visits were restricted to end of school term holidays, and to weekends for the Southern community. It was very much a case of wearing two hats, one the researcher and the other the teacher. By October 1996, however, it became apparent that the

increasing time and financial requirements needed to complete the book project, were beyond my capacity. It was a critical time for my family, as up until then we had been financing the costs of the research ourselves. Fortunately, and quite out of the blue, I received funding that allowed me to continue full time on the book development project during 1997, consequently, 26 weeks were spent away from home working in the communities during the year. In 1998, I took long service leave to work on the book drafts.

The contextual setting for the original research work comprised two phases. The first phase involved an exploratory fieldwork program, focussing on three Aboriginal communities. This was done in collaboration with community members, gathering and developing cultural content for a secondary school Earth Science textbook. In the second phase, I completed an M.Ed., focused on science and Aboriginal studies. My approach towards both the book and M.Ed. thesis was from first principles; starting from the basics. This implied working cooperatively alongside of, and collaboratively with the appropriate Elders and Traditional Owners, within their community and on their Country. I have named this original research work the 'book project work'.

3.2.2 Rationale for the Current Study

On reviewing the relevant literature, I discovered the scarcity of research regarding two-way secondary science education. Deslandes et al. (2019, p. 58) define two-way science as '…a pedagogy, a way of teaching and learning that connects Aboriginal knowledge of the environment to Western science and the school curriculum'. It is an approach that uses science as a vehicle for connecting traditional Indigenous ecological knowledge to the Australian Curriculum in a learning program.

Chapter Two highlighted the many factors which impact on successfully bridging cultural borders within the two-way science classroom. Mention was made of the strategies

that teachers may utilise in transcending the traditional teaching and learning methods for teaching across cultural divides (Aikenhead, 1997; Ogunniyi, 2007a). Two-way education appears to provide a valid, relevant and efficient strategy for forging a voice for Aboriginal Australia to this end (Harris, 1990).

In asking myself what my primary goal behind this study was, I came to the conclusion that I should investigate the underlying processes involved in establishing and maintaining relationships with the Aboriginal Community such that we could co-create knowledge that would be used in a secondary science textbook. I expected that a detailed analysis of the overall process would provide some guidance for other researchers to follow, and at the very least, show other potential researchers and curriculum developers what *not* to do. This research attempts to provide some guidance and answers for those courageous science teachers who might wish to take up the 'two-way' challenge.

3.2.3 Research Question

This research study's main question is: 'What has been the role of professional conversations in the mobilisation of Aboriginal knowledge from Country to Classroom?'

My interpretation of this question is adapted from the building and construction trade and relates to the majority of the practises and activities managed during the preparatory stage, by the Project Manager, who for the purposes of this study is the researcher. The Cambridge Dictionary defines 'mobilisation' as 'the act of organising or preparing something, such as a group of people, for a purpose'. The reader is urged here too that within the context of this study, the word 'Classroom' should be interpreted as 'book', referring to the Earth Science textbook that was developed in each of the three Aboriginal Communities. The intention here is to convey the message that the final recipients for the Community driven efforts were the classroom science students.

I intend to use the chosen methodology and methods to derive these 'Mobilising' aspects by working through the following sub-questions:

1. What key talking types took place to inform the mobilisation?

2. Who were the key players involved in the interpersonal verbal communications?

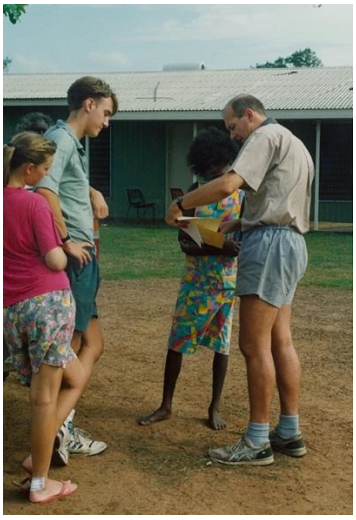
3. How did the interpersonal verbal communications that took place relate to the different ways of speaking, to location, relationality and positionality?

4. What were the enablers and restrainers that influenced the collaborative process, and how did they impact the work?

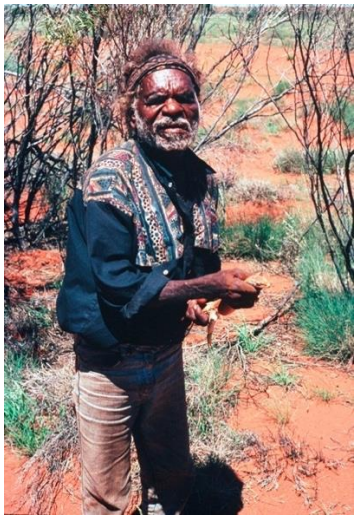
5. Is there any similarity between key aspects of the fieldwork among the three Communities?

6. What were the lessons learnt during the mobilisation?

3.2.4 Research Settings



Top-End – Community chat



Centre – Bobby with lunch

Southern – Lex and Darcy, on Country

The original settings for this current study were the three Aboriginal Communities and their surrounding Country. In the current study, I have de-identified the three Aboriginal Communities and their associated Country, designating them as the 'Top End', the 'Centre' and the 'Southern' respectively. The vast majority of these settings involved face to face social interactions, where the conversations were conducted between Self and Others in the course of the book project. These talks took place within each Community at various locations (school, council, club, home, and store) or on Country at various cultural sites.

While the vast majority of these conversations were in-situ and face-to-face, a much smaller proportion was conducted where necessary by phone. So, the verbal communications (content and detail), and associated contextual and situational information that arose from and within these settings are what formed the basis for my autoethnographic account and constitute the data that is being thematically analysed. All of which was in stark contrast to my COVID-enforced isolation experienced during the gathering, organising and analysis of data for this study.

3.2.5 Section Summary

The information that arose from the various settings experienced, as mentioned above, details the locations where face to face talks took place, the type or style of talking pursued, observations of social dynamics, and occasional references to emotions felt or portrayed.

3.3 Speaking in Voices to Assist the Methodology

For this section, I will build on the introduction to '*voices*' in Chapter One. In this chapter I present my discussion of methodology using 'speaking in two voices'. The first is my *academic* voice that discusses each topic using traditional academic critique, précis, and references. The second is my 'field researcher, insider/extended family member' voice that helps to reveal my autoethnographic reflexive, evocative *self* to this thesis.

Greenfield (as cited in Maydell, 2010, p. 3) points out a potential value for an outsider's perspective as being

> …an out-group member who can identify interesting and important cultural meanings usually taken for granted or even neglected by insiders. In this sense, the best position is the combination of insider and outsider roles, what Greenfield terms 'the culturally marginal person'; these are people who have had important socializing experiences in more than one culture.

Maydell (2010, p. 4), when referring to her researcher default position, states that 'While ethnography is aimed at providing descriptions and interpretations of cultures of different groups, the researcher who comes from an insider perspective has an autoethnographic position by default'.

This complex study describes the processes that I have used to reveal my position in relation to the data used in my autoethnography. Within this evocative narrative I have adopted the strategy of different 'voices' (McMahon & Dinan Thompson 2008), speaking either academically or as an extended family member to project my positionality. I have included vignettes in this study to illustrate, in part, how the data is being shaped, through my positionality, as the research proceeded. In introducing the practice of reflexivity, I begin to tackle the question of who I am, in relation to the research.

3.4 Reflexivity

I am now going to build on the concept of reflexivity, which I remind the reader was introduced in Chapter Two, Section 2.4, as it applies to autoethnography. Autoethnography is reflexive and positions the researcher within the study, in that the author of an autoethnography is both subject and researcher (Coffey (2002), as cited in Lapadat, 2017).

Denzin (2014, p. 22) contributes further advice, 'Autoethnography is reflexively writing the self into and through the ethnographic text; isolating that space where memory, history, performance, and meaning intersect'. In my study it is a case of combining a narrative; juxtaposed with both field and diary notes and supplemented by memories as an alternative way of practising deep introspection and reflexivity, often with startling clarity of past events.

The field notes and diaries were my primary data body to look back over, reminders of what went well, and what needed improving in terms of how I conducted myself in the Community. The data was the primary source for my analysis, when writing my analytic memos, and often I would supplement these with memories of the event. Both processes – Community based and current study – required reflexive thinking, pondering over what had taken place, endeavouring to extract useful information. The following table demonstrates an example of reflexive writing at the initial stage of the analysis.

Table 3.1 Extract from Diary – 11 Apr 1994, Indicating Categories and Analytic Memos

Diary Extract	**Categories**	**Analytic Memos**
Luggage: 16kg allowance. Jim was bus driver. Checked with Linda (Community school) and was okay for tape recorder. Met with Aunt Penny and Andy. The initial request for assistance was okay. Visited the club and spoke with Jack for a while. He will try to organise recording sessions tomorrow, with Aunty Penny and Andy. Jack said two languages were spoken, Kunwinjku and Mangirrdi, the latter is the original and spoken now only by Traditional Owners. I spoke to Aunt Penny, buying her a drink. I walked her home, speaking about our families.	• Talking, research, school visit, access resource, support network. • Collaborative, talking, meeting, social, cultural, support network, help agreed. • Collaborative, talking facilitate data collection. • Talk, social, cultural info., impromptu. • Talking wrt families, social/family, obligation and interaction.	Collaborative talk – school support, access resource. Collaborative talk – positive response, help indicated. Collaborative talk – support indicated, positive response, sharing community TK history. Family talk – sharing family info. Establishing rapport.

Speaking as insider/extended family member

By April 1996 I had been working in the Top End Community for a full two years (see Figure 3.1). During this period, I had decided, as part of the developmental work, to find out what the Aboriginal locals thought about Aboriginal science, what they knew about Western science and their opinions on combining the two bodies of knowledge in one science book.

By this stage of the original bookwork, my extended family connections with the Aboriginal participants indicated I had achieved an insider status. Consequently, when with the families, and particularly in social settings, I acted as a family member. I would defer to the older family members, speaking softly and casually, always trying not to push in, and being an active listener. When on my own or with the white community participants, however, writing or discussing the diaries, field notes and book drafts, I would revert to being the objective, more formal researcher. This insider-outsider dual lens was a tool that I learnt early to use when confronted with the dissonance between perceptions of self and community. A case of playing the two roles.

I put it to Traditional Owner 'Jack':

Some teachers, educators have told me about this 'Aboriginal science'. Could you tell me a little bit about that?

After a long pause, 'Jack' replied:

Yes, we got science, you can look at um … before wet season you get flowers on trees … that's easy. You know you are going to have 'red apple'. You know you will be having plums of all different kinds. But we've got science that tells you too, like um … insects.

3.5 Ontology, Epistemology, Axiology and the Research Framework

This section adopts a 'speaking in voices' approach to explore the ontological, epistemological and axiological frameworks relevant to this study, and within an autoethnographic context, by considering each conceptual construct through its contemporary perspective. The relevant research literature informs my opinion that exploring for further evidence of new knowledge, and working through these conceptual frameworks will both identify and define the very nature of that knowledge. TerreBlanche and Durrheim (1999) (as cited in Thomas 2010, p. 292) state that

> …the research process has three major dimensions: *ontology*, *epistemology* and *methodology*. According to them a research paradigm is an all-encompassing system of interrelated practice and thinking that define the nature of enquiry along these three dimensions. … Ontological and epistemological aspects concern what is commonly referred to as a person's *worldview* which has significant influence on the perceived relative importance of the aspects of reality.

3.5.1 Autoethnography and Ontological Considerations – Introduction

Speaking with academic voice

My discussions conducted with the white community members were, ontologically speaking, within the Western domain. Generally, they were framed and shaped by Western knowing, situated within scientific or linguistic contexts, and essentially professional and objective in nature. By marked contrast, the above discussion with Jack alludes to what the research literature labels as Aboriginal ontology, at the heart of which lies the person–land–ancestral interrelationship (Rumsey, as cited in Kenny, 2013) and this system of belief is

referred to, in English, as ‘the dreaming’. Aboriginal ontology ‘encompasses all dimensions of life’ (Kenny, 2013, p. 135).

In a real sense this vignette also presents a powerful acknowledgement of the interplay between two ontologies, worldviews, two ways of knowing: the Western and the Aboriginal. This two-way mix lies at the core of this current research study. The answer to the ontological question, ‘What is being?’ differs depending on the frames of meaning within which the question is asked. The scientific answer to this question refuses to admit all nonquantifiable data into an acceptable account of reality (Noonan, 2008, p. 578). Hence, the problematic status of Traditional Ecological Knowledge (TEK) within the overall matrix of scientific knowledge.

The empirical researcher who does not explicitly pose ontological questions fails to ask the most important question of social research: How did the given social reality come to be constituted as it appears? The social domain ontologist recognises that unlike the objects of natural science, which are not produced by human action and thus constitute a reality that truly is given to the mind to investigate, social reality is the result of complex forms of human action and interaction. In other words, social reality is dynamic. Noonan (2008, p. 581) concludes that ontology is essentially viewed today as a form of questioning that is best practised in its totality, embracing both a critical discipline and a positive philosophical science, connecting both to the investigation of natural and social phenomena. Positive knowledge derived from both social and natural reality cannot do without empirical and statistical methods. Ontology (natural or social) serves to remind me that no particular conceptual system is ever fully adequate for investigating the complexity of reality. Ontology remains relevant as a necessary foundation for the critical understanding of autoethnographic

research, where this form of qualitative research involves self-observation and reflexive investigation in the context of fieldwork and writing.

The significance of autoethnography, in terms of examining the space between reflection and action in the form of emancipatory practice towards generating positive pedagogical change, is that it represents achieving transformational practice and subsequently, meeting the demands of ontological authenticity (Austin & Hickey, 2007). The freedom of expression within the autoethnographic paradigm is reflected in this study by domain ontology, using the visually organised mind-map to represent my personal engagement with the central *two-way* concept as shown in Figure 3.2. Domain ontology, a contemporary paradigm derived from classical ontology, similarly attempts to provide answers to the metaphysical questions like 'what exists?' and 'what is the nature of reality?' The majority of applications for domain ontology belong to the computer sciences and are designed for the mass sharing of knowledge (Gruber, 1995).

Furthermore, the development of ontologies for various purposes is now a relatively commonplace process (Tonkin et al., 2010). Domain ontology's holistic approach and ability to establish interoperability between a model and the data is also acknowledged (Koo et al., 2012). Hence, domain ontology type may well have application towards exploring the researcher's engagement with the development of two-way science through Community involvement. There is no one 'correct' way or methodology for developing ontologies nor modelling a domain (Noy & McGuinness, 2001, p. 4). A first pass of a domain ontological model for my current study is shown in Figure 3.2.

Figure 3.2 Part of the Original Mind-map for the Textbook *Top-End Community*, Intended as an Overall Perspective of the Interrelationship between the Culture, Content and Topic Areas of the Book

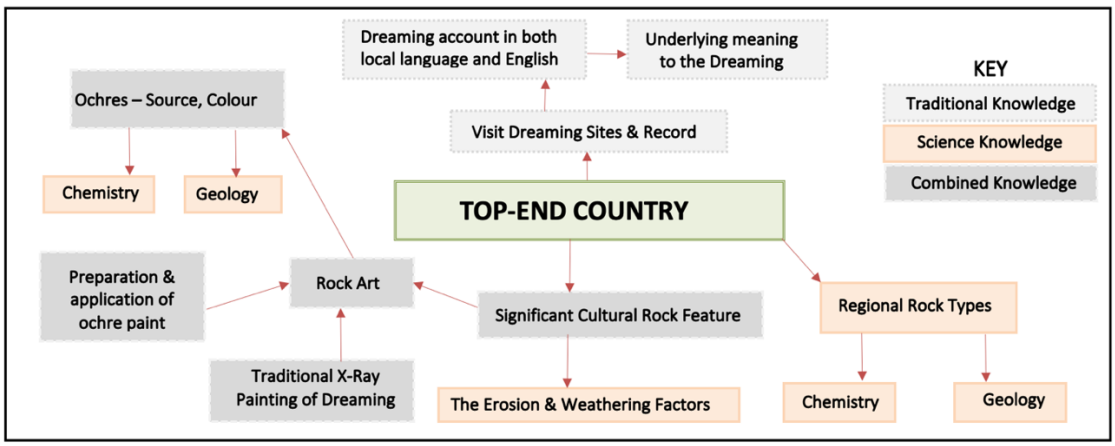
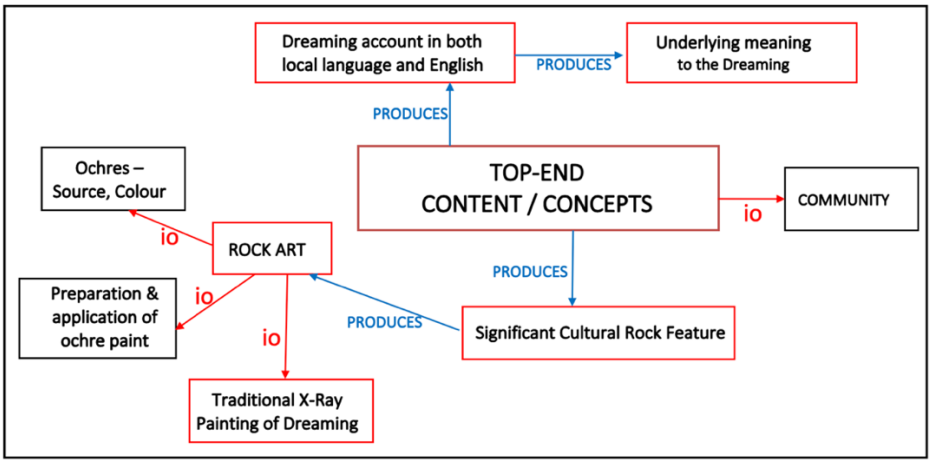


Figure 3.2 represents a conceptual and content-based mind-map taken from the original book, *From Country to Classroom*, which shows the interrelationships between the content topics within a two-way Earth Science unit developed for the book. Figure 3.2 can be explained by Noy and McGuinness (2001), who provide a good starting point for developing a domain ontology. They explain that an ontology is a formal explicit description of concepts in a domain of discourse (**classes**), properties or roles of each concept describing various features and attributes of the concept (**slots**), and restrictions on slots (**facets**).

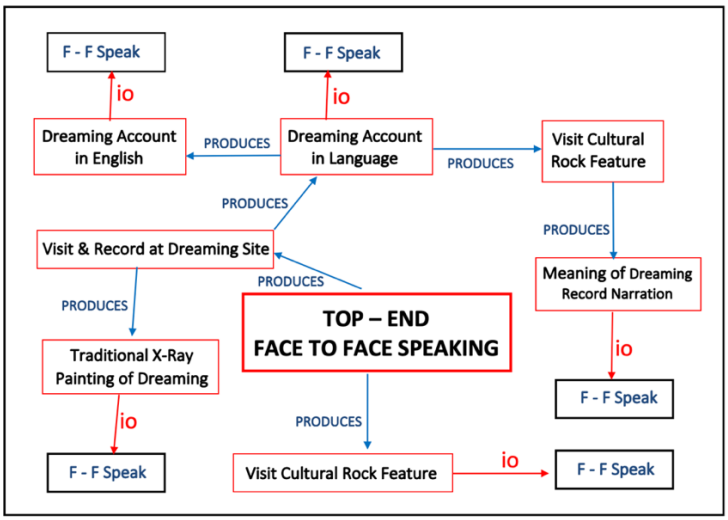
An ontology together with a set of individual **instances** of classes constitutes a **knowledge base**. Classes are the focus of most ontologies and describe concepts in the domain. The classes shown in Figure 3.3 are the Traditional Knowledge connected topics or concepts such as ochres and relate directly to the mind-map shown in Figure 3.2. Subclasses for this example are their sources and colours. The slots, not shown, would refer to the specific cultural properties for each colour.

Figure 3.3 Ontology for the Traditional-Knowledge-Connected Topics or Concepts Such as Ochres



For the purposes of this study, the ontological domain represents the bi-cultural or two-way science curriculum development, and the domain ontology shown in Figure 3.4 explores the interpersonal, face to face, verbal communications conducted as part of the in-field research. The ‘F-F speak’ classes have not as yet been developed further into their subclasses and await the findings from the data analysis. The ontology provides a clear link between the specific situation (class) and activity (processes) to the face-to-face verbal communications undertaken. I’ve used black for classes and red for instances. Class names are capitalised, and slot names are lower case. Direct links represent slots and internal links such as ‘instance of (io)’ or a ‘subclass-of’.

Figure 3.4 Ontology for the Interpersonal, Face to Face Verbal Communications



3.5.2 Autoethnography and Epistemological Considerations

According to Maxfield & Babbie (2014, p. 4) 'Epistemology is the science of knowing, and methodology (a sub-field of epistemology) might be called the science of finding out'. Many cross-cultural or two-way science teaching materials present comparisons between Indigenous knowledge and Western science, which can be organised around the following four main themes: general ideas about reality, ideas about how to understand the world and what those ideas are based upon, what is valued within each knowledge system, and issues of power associated with each knowledge system (Aikenhead & Michell, 2011, pp. 112–113). These themes correspond roughly to what academic scholars refer to as the ontology, epistemology and political status of Indigenous knowledge and Western science. Some Aboriginal Elders and Traditional Owners speak about 'two-eyed' seeing, a perspective that emphasises the strengths of both Indigenous ways of living in nature and of Western sciences. These words correlate closely with my own observations.

Autoethnography as methodology provides me with a powerful, effective method for investigating educational programs that bridge between two cultures. As a methodology it

provided me the opportunity to self-realise and understand just how I engaged and communicated with Communities towards mobilising Aboriginal knowledge. Autoethnographic writing has encouraged me to engage in 'self-talk' – inquiry about how I think about my experiences with external events and reflect on how these clarify and expand my own understandings and feelings. Autoethnography provides a powerful, effective method for developing self-reflective abilities, potentially becoming a tool for social change (Glowacki-Dudka et al., 2005). My autoethnographic study has been no less effective because it has led to the self-realisation that my collective Community experiences and engagement have been transformational and life changing.

My cross-cultural curriculum work will hopefully facilitate, in a small way, the reconciliation process, 'bringing us all under the one umbrella'. Autoethnography is a self-reflective form of writing used across various disciplines, including education. 'Autoethnography is a form or method of research that involves self-observation and reflexive investigation in the context of ethnographic fieldwork and writing' (Maréchal, 2010, p. 43). The analysis process for this study was often associated with startling and emotional recall of what I had learnt from the Aboriginal Elders and how my awareness for the need for educational change was kindled.

My research method might also be classified as constructivist, to the extent that it elucidates 'local' as opposed to 'universal' meanings and practices, focuses upon provisional rather than 'essential' patterns of meaning construction, and considers knowledge to be the production of social and personal processes of meaning making. Core techniques associated with a constructivist approach include analysis of narrative processes in spoken or written 'text', and discourse analysis (Neimeyer & Levitt, 2001, p. 2651). These two analytic modes have significant relevance to my data body. It is argued by Mills et al. (2006) that all

variations of grounded theory exist on a methodological spiral and reflect their epistemological underpinnings. At one extreme is the active repositioning of the researcher as the author of a reconstruction of experience and meaning (p. 2). Epistemologically, constructivism emphasises the subjective interrelationship between the researcher and participant, and the co-construction of meaning (Hayes & Oppenheim, 1997; Pidgeon & Henwood (1997), as cited by Mills et al., 2006, p. 26).

Accommodating the dual insider-outsider lens, by adopting the appropriate perspective as the situation required, did create tension and dissonance, as self interchanged between the researcher and extended family member roles. And – as I was to surprisingly find twenty years after – it would carry through as an emotive force, a virtual backdrop into the analysis stage of this current research. It seems that when one's self adopts a role-playing existence, over a long period, while occupying an immersive, passionate, experiential interface between the researcher and community member, the effects on one's psyche are lasting.

3.5.3 Autoethnography and Axiological Considerations

In addition to considering the three defining characteristics of a research paradigm suggested by Guba and Lincoln (1994) – ontology, epistemology and methodology, Heron and Reason (1997, p. 287) argue that an inquiry paradigm also must consider a fourth factor: axiology. Johnson et al. (2011, p. 137) suggest that axiology is integral to the conceptual framework underlying one's worldview, where influenced by 'proximate goals, values and morals'. My way of seeing this research study provides a purview of my verbal interactions with the Aboriginal community participants. It also reflects my conceptualisation of a worldview, a way of seeing the world, through a social justice lens, which espouses a particular educational philosophy, that of two-way curriculum development and delivery.

My worldview links in with an appropriate and chosen way of analysing events, an inquiry paradigm. Inquiry paradigm is defined as 'the basic belief system or worldview that guides the investigator, not only in the choice of method but in ontologically and epistemologically fundamental ways' (Guba & Lincoln, 1994, as cited in Creamer, 2003, p. 448).

Speaking with extended family voice

The main priority for the work in the communities had been to get the book job done. I mean, that's why I was there. It often worried me though that I had other things to learn about, like acquiring the right know-how about getting on the best way with the mob. So, I kept notes on how I was going, just so I could look back to the previous trip and try and do better next time. So, in a sense I was learning new stuff on two levels: the book-related cultural stuff, and the family relationships stuff – knowing how to do things the proper way. One was as important as the other. I would often consult with Darcy from the Southern Community when the Community social dynamics dictated a need for extra mentoring. Darcy referred to this as cultural awareness training. In a formal sense it was part of his government work, but for me it was one to one, personal and ongoing.

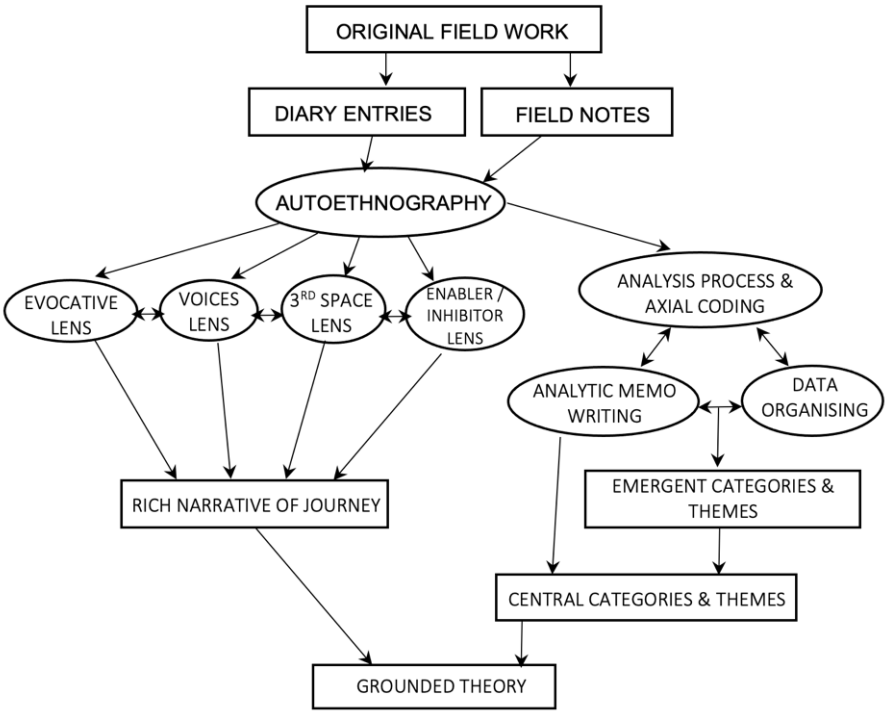
3.5.4 Research Framework: Guiding Ideas for the Development of the Research Design

The research framework for this autoethnographic study is essentially one of an exploratory qualitative design. In general, autoethnographic studies, such as my own, are more suited to creating theories than testing them (Duncan 2004). At the time of my research, there were very few existing theories specific to my field because of the newness of the two-way delivery of secondary science education, combined with its innovative approach to the research and development of the primary sourced cultural content (Aikenhead, 1997; Michie, 2002; Ninnes, 2000, 2001; Smith & Michie, 2019).

Therefore, I did not set out to test an established theory; rather, the autoethnographic methodology and methods allowed me to explore my own sense of Self through the informal, subtle training and learning in cultural conventions through the hearts and minds teaching by my Aboriginal participants. I was then better prepared and positioned to find those connections to wider cultural meanings about Community and Country, and better prepared to develop theories for improving the practice of two-way science curriculum content design that might be tested later. But these theories must focus upon the primacy of People and Community bonding and attachment, the essential prerequisites to subsequent research. Indeed, my qualitative research as a journey of self-discovery, functioned in self-reflexivity and autoethnographic reportage and arguably can be viewed as contributing to the ideology of self-contained individualism. My journey uncovered deeper personal connections to people and Community way beyond the scope of the original bookwork. The literature refers to the alternative forms of discourse arising from autoethnography having much to be welcomed (Gergen & Gergen, 2000).

In this autoethnographic study I have adopted a discourse which utilises various lenses of evocativeness, voices, and enablers/restrainers to explore the journey from 'Country to Classroom'. Figure 3.5 presents a model to demonstrate the duality, the quantitative and qualitative modes of this study.

Figure 3.5 An Elemental Model of the Wholeness, linking Coding with Narrative.



Adapted from "The Coding manual for qualitative researchers", Saldana, J. (2012). (2nd edition).

3.5.5 Section Summary

This section has explored the ontological and epistemological frameworks relevant to this study, and I have considered both these concepts through their contemporary perspectives. I have presented my discussion of methodology using two voices. I conclude this section by reiterating the central thrust, where an evocative and thematically based autoethnographic process provides for an entirely appropriate and sensitive means for exploring Community-based, interpersonal conversations aimed at co-creating a two-way science curriculum.

3.6 Research Methodology

This section describes the overarching qualitative methodology utilised in this research study. Through the implementation of different voices, the reader is taught the characteristics of the combined evocative and analytic autoethnographic style of narrative.

3.6.1 Autoethnography as Research Design

Autoethnography allows for the intersection of art with science (Ellis (2004), as cited in Tilley-Lubbs, 2018. I have however approached autoethnography with some timidity. The literature provides notes of caution. Winkler (2018, p. 244) concludes his paper with the advice, 'For some readers of this article, my text may only constitute yet another proof that researchers are better off when they avoid autoethnography as it may constitute nothing else but a minefield'. The angst and cause for concern is rooted in the traditional and historic evocative nature of autoethnography, however recent research is evident where an evocative autoethnography can be combined with the analytic form of autoethnography (Anderson, 2006; Tedlock, 2016, p. 358–510).

For example, Williams & Jauhari bin Zaini, (2016, p. 35) are unequivocal about combining the two elements – evocative and analytic – in their research for they argue that the two terms have created normative understandings about both forms, 'These terms have been used not merely as descriptions of types of ethnography but normative statements about what autoethnography can or should be'. They claim that both the analytical and the evocative can in combination present a more holistic account of the story that I am telling. You have the qualitative side – the rich and stimulating narrative – integrated with the quantitative – more structured and objective based, not in opposition but balanced, complementing one another. Tedlock (2016, p. 358) describes this process as 'braiding evocative with analytic autoethnography'. In my case, it was looking back at my membership within the Community, using my personal knowledge, memory and data, and combining all these veritable threads and yarns of stimuli into a fabric of cultural background to form a rich tapestry of new knowledge

Recent academic publications have endeavoured to systematise autoethnography as a valid and recognisable social science method that is being adopted in a wide range of disciplines, including the humanities, health sciences, communications and business (Gannon, 2017; Lapadat, 2017). As a fundamental acknowledgement of this development, I have for the purposes of this study, adopted autoethnography as a qualitative social science methodology. I have engaged this research methodology as a mechanism and tool to explore and attempt to answer the research questions. This research provides the reader with an autoethnographic reflexive and evocative fractal with imaging of a dynamic research system that's recursive with applications of procedures and processes sustained across the data from all three of the Aboriginal communities featured in this study. In my case, re-emphasising once again, the only way I could possibly present the full picture of my journey was to combine the quantitative with the qualitative; specifically, the frequency counts and percentages attached to how many times I spoke to a participant, and what percentage of talking was conducted at a certain Community location. This information has no equal in truth telling, and when you combine this quantitative side with the situational context – a rich, descriptive and evocative narrative – the reader receives a more complete picture of the event.

A review of the literature reveals that autoethnographic methodology emphasises critical reflection upon personal experience to provide contributions to knowledge, particularly into issues which are difficult, sensitive or normally off-limits (Jones et al., 2013).; Ellis et al., 2011). The literature also reveals that there is not a single stance in terms of orientation of approach (Adams & Manning, 2015) or writing style (Chang, 2013). Instead, it can vary from a theory-grounded analytical account to an imaginative and expressive dialogue (Harwood & Eaves, 2017, p. 8). Ellis et al. (2011, p. 1) state that 'Autoethnography is an approach to research and writing that seeks to describe and systematically analyse

personal experience in order to understand cultural experience'. They go on to say that researchers 'realised that stories were complex, constitutive, meaningful phenomena that taught morals and ethics, introduced new ways of thinking and feeling, and helped people make sense of themselves and others' (Ellis et al. 2011, p. 2). Consequently, autoethnography is an approach that allows me to acknowledge and accommodate my subjectivity, emotionality and my influence on the research, rather than hiding from these matters or assuming they don't exist (Ellis et al., 2011, p. 3).

My choice for a combined evocative and analytic autoethnography as an over-arching methodology was dictated by my decision to be open and honest with the telling of my story. In a sense, I am adopting a fair but critically analytical perspective of Self and delivering that perspective with an underlying evocative fabric. In essence, I needed to understand what it was that I did and how I did it. I needed to understand what was involved for me physically, mentally and emotionally when working with and within three different communities. I wanted to be able to explain how we talked and where we worked collaboratively and under what circumstances. And I needed to do this in order to answer my research question. Thus, taking on both an analytical and an evocative autoethnographic approach was the only way I could understand all that had happened over the course of ten years of fieldwork.

My overall aim is to try and paint a mental picture for the reader about my original book research, conducted over a lengthy period. I do not believe that any other research methodology could come close to meeting these requirements. As a retired secondary maths-science teacher looking to perform my own Aboriginal-community-based research and development experiences, I wanted to be able to rigorously research the connections and processes of my personal field research experiences with the intra-community subcultures, through sociological self-exploration (Starr (2010), as cited in Le Roux, 2017). I have utilised

my own stories, voice and experiences, all detailed and referred to within the diaries and field notes, all supplemented by memories stimulated by the data. With these scoping parameters in mind, I found autoethnography to be the optimal research methodology to enable both recall and analysis of the experiences (Ellis et al., 2011). My ultimate goal is for a moderate and balanced treatment of autoethnography that allows for innovation, imagination and the representation of a range of voices in qualitative inquiry while also sustaining confidence in the quality, rigour and usefulness of academic research (Stahlke Wall, 2016).

3.6.2 Use of Different Voices in an Autoethnographic Context

This section revisits the topic of 'voices' introduced in Section 3.3 and develops this methodological tool in a more autoethnographic context. As shown in my discussion of the ontology and epistemological dimension of this thesis, and illuminated in the vignette with 'Jack', I will be employing different voices throughout this thesis as appropriate to the context of each section. Here, I discuss in more detail the rationale for taking this approach. In this section I will be speaking alternatively in academic voice and in extended family member voice. I'm using this as a strategy to project two vastly different self-personas. But, as Goulding et al. (2016, p. 11) point out, researchers need '…to strive to ensure that there [is] an accurate and respectful presentation of local Aboriginal voices'. By academic voice I am implying more formal aspects of voice compared to everyday, conversational speech. Furthermore, my academic voice is my 'research' voice, occurring years after the conversation took place. The literature informs me that typically, academic voice avoids informal language and utilises an authoritative tone.

Gray (2017, p. 180) examines the variations in academic voice. In his paper, Gray argues that by understanding both the historical tensions and the current issues affecting academic voice we enable increased transparency, reflexivity and trustworthiness in research.

He continues that '[a] more open and reflexive dialogue on academic voice would better connect the pursuit of knowledge (and the research process) with how one represents such knowledge through their scholarly writing'. The academic tone of an academic paper has a voice characterised by writing, which is precise, logical and conforms to standards of formal English. Alternatively, speaking in extended family voice projects a softer, more unassuming style, utilising common everyday conversational speech, with a tendency for adoption of Aboriginal English terms and expressions. Permission to adopt this voice came after about two years in each community. I was variously acknowledged by families as cousin, and brother. Examples of my extended family member voice will arise in the various vignettes interspersed throughout the thesis.

My approach to my autoethnography mirrors that of 'community ethnography', where I have used my personal experiences as a researcher working in collaboration with community-based participants to illustrate how a community manifests a particular issue (Ellis et al., 2011). Further rationale for my choice of methodology is reflected by McMahon and Dina Thompson's (2012) decision to base the research on personal experiences. 'I have employed my own stories, voice, body's voice and experiences as data. With this in mind, I found autoethnography to be the optimal research methodology to allow me to recollect and excavate my experiences' (p. 37).

In my case, the reader should interpret my experience as that of a secondary maths-science teacher working within Aboriginal community-based cultural settings. My story is written in first person and includes dialogue, emotion and subconscious thoughts. My titles include 'writing with self', explains the importance of 'Self' in relation to my-self, my-voice/s and the voice of others in the writing of this paper. In the presentation of my story, I have also adapted Sparkes' (2004, p. 158) personal and academic voice framework for

analysis by titling sections ‘writing with self’ and ‘writing with academic voice(s)’ to demonstrate my stepping in and out of the experience and reflecting on what can be learnt. (MacMahon & Dina Thompson, 2011, p. 36).

3.6.3 The Hows, Whys and the Wherefores

This section attempts to explain the how’s, the why’s and wherefores behind the process of telling my ‘Country to Classroom’ story of the journey in terms of the methodology chosen and the methods employed. I will be explaining how and why autoethnography was my chosen overarching methodology. Technically, I have applied a mixed methodological approach, which I believe provides new insights into challenging problems such as the study of human creativity (Pace, 2012, p. 13). As Saldaña (2012, p. 10) succinctly puts it, ‘Quantitative analysis calculates the mean. Qualitative analysis calculates the meaning’. In the presentation of my story, I have adopted and modified a strategy from Sparke’s (as cited in McMahon & Thompson, 2012) ‘personal and academic voice framework’ for the analysis by titling sections ‘writing with self’ and ‘writing with academic voice’ to demonstrate my stepping in and out of the experience and reflecting on what can be learnt. As there is no research from the educational perspective of lived experiences within Aboriginal communities and the deeper connections between personal and cultural, I will draw on literature relevant to the social sciences and knowledge management.

Speaking as both researcher and author, I wanted to learn from my experiences working alongside of, and collaboratively with, many Aboriginal community members. I want to both improve my personal performance in the field, and through my writing, share what I have discovered and learnt autoethnographically as best practice. I see these two aspects as my autoethnographic self as taking a critical cultural stance that was in keeping with Goodall (2013, p. 207) who says ‘[o]ne result of that critical cultural take is a

furtherance of that “sunny side of the street” evolution in our ethnographic understanding of the relational ethics and institutional constraints that should light and guide our best practises by reflexively not just showing what we did in the field, but how and why we did it’. By adopting a self-reflexive writing style, I am hoping to couple my personal experiences – as reflected in my diary entries and field notes – with careful observation and critical thinking about my experiences interacting with the key community participants, and share with the reader. I have connected this autobiographical narrative to wider cultural, political, and social meanings and understandings (Ellis, 2004). I chose to use ‘narrative’ in preference to ‘story’ because I am attempting to present a much bigger perspective, a way of looking at the world; in fact, two worldviews (Adams, 2019).

Increasingly, autoethnography has become the term of choice in describing studies and procedures that connect the personal to the cultural. Although reflexive ethnographies primarily focus on a culture or subculture, authors use their own experiences in the culture reflexively to bend back on self and look more deeply at Self–Other interactions, and by ‘[telling] a personal tale of what went on in the backstage of doing research’ (Denzin & Lincoln, 2000, pp. 740–741). Autoethnography is therefore providing me with a means to critically examine what went on in the backstage of doing this research by engaging in self-reflective writing that involves self-observation and reflexive investigation into the context of my ethnographic fieldwork, and in writing that connects with my autobiographical and personal Self as well as my cultural, social, and political Self (Ellis, 2004; Maréchal, 2010).

3.6.4 Speaking/Reflecting as an Extended Family Member

As an extended family member, I became privy to the inner workings of several families within each community. I shared in many of their family events, which featured a mix of emotional settings, and I found this enabled me to more sensitively view my own

work within their community and left me better positioned to convey a more personable, more humanistic element in the book content.

It gave me a sense of legitimacy, a strong sense of connection and an urgency to see the job through. It heightened my awareness of the families' contrasting dualism of empowerment and disempowerment. Sharing in their Traditional Knowledge was empowering, while at the same time being made aware of their collective disempowerment. The interpretation all depends on what frame of reference you apply. The family members were the only ones empowered to help me. It was essential for me to immerse myself in their community, to increase their awareness of my need for support. I was operating well outside the field researcher norms, gradually becoming accepted and recognised as one of their family. This research study gives me an opportunity to take what I learnt, as an extended family member, even though it wasn't the primary objective, and present it as new knowledge in the hope that it will encourage and provide some guidance for other educators wishing to take up the two-way education challenge.

3.7 Methods of Data Collection

This section provides an explanation for the methods I used to collect data. The implications for both data collection and gathering for an autoethnography embrace issues of ethics, and objectivity. This current study also assumes a reflexive stance within the autoethnography, in that I have had to reflect upon my own biases, values, privileges and assumptions, and have actively sought to write these into the research (Creswell, 2012, p. 626). Genuine collaboration between the researcher and other fieldwork participants is critical for the collection of ethically sound and trustworthy data (Chereni, 2014, p. 1). Methodological literature sufficiently demonstrates that achieving collaboration largely depends on how the researcher negotiates the inevitable differences and asymmetries between

themselves and other fieldwork participants (Ng (2011), as cited in Chereni, 2014). The process of situated knowledge production in cross-language and cross-cultural research is influenced by the subjectivity and positionality of researcher, assistants and participants (Caretta, 2015, p. 491).

It is understood now that the observer is inevitably tied to what is observed, and the rationale for striving to eliminate 'observer bias' is considered untenable (Angrosino & Mays de Perez, 2000, pp. 673–702). All social observation involves the observer's participation in the world being studied, and observers now function as collaborative participants in action inquiry settings. As relationships unfold, participants validate the cues generated by others in the setting and, during the observational process people assume situational identities that may not be socially or culturally normative (Fontana & Frey, 2000, p. 634). Autoethnographers thus consider 'relational concerns' a crucial dimension of inquiry (Ellis, 2007) that must be kept uppermost in their minds throughout the research and writing process (Ellis, 2011).

The autoethnographer values narrative truth, based on what a story of experience does, how it is used, understood and responded to (Bochner, 2012). Autoethnographers also recognise how what we understand and refer to as 'truth' changes as the genre of writing or representing experience changes. Moreover, we acknowledge the importance of contingency. We know that memory is fallible, that it is impossible to recall or report on events in language that exactly represents how those events were lived and felt; and we recognise that people who have experienced the 'same' event often tell different stories about what happened (Tullis et al., as cited in Ellis et al., 2011). Consequently, when terms such as reliability, validity and generalisability are applied to autoethnography, the context, meaning and utility of these terms are altered (Ellis et al. 2011).

3.7.1 Gathering Data Sources

This section introduces discussion about the different forms of data used in this study. The data body consists of detailed field notes recorded during the original fieldwork, notes written from memory sometime after the event, work diary notes and entries, and memories of past events aided by photos and slides. Additionally, a smaller amount of data was collected and gathered more recently from face-to-face communications with some original participants.

3.7.1.1 Data Derived from the Original Study [Internal Sources]

The internally sourced sets of data consist of work diary notes and entries, more detailed field notes recorded during the original fieldwork, notes written from memory sometime after the event, and memories of past events aided by photos and slides.

3.7.1.2 Personal Work Diary Notes

The data gathering process drew extensively, and at depth, upon diaries covering the ten-year period of the original research project, one per year. These entries are in the main brief, with one to four lines of text, but a significant number run to 30 lines, occupying an entire A4 page. The diary entries tended in the main to be more sparse, objective and cryptic than the field notes and these entries were made as immediate to the event or activity as the situation allowed.

3.7.1.3 More Detailed Field Journals

I kept A4-size fieldwork notebooks to record events in greater detail. I used field notes for additional, supplementary records for events only when it seemed necessary. These occasions were usually associated with major pivotal stages of the ‘Country to Classroom’ development and were often accompanied by strong emotive experiences. The field notes were normally written at a later stage, and tend to contain more reflective and reflexive commentary, such as personal thoughts, reflections and opinions – details not shown in the

earlier diary entries. Consequently, these notes were often more subjective in nature, and sometimes with an emotive overlay. During some periods of intense fieldwork, the one A4 page of daily diary allocation was simply insufficient for the amount of information.

3.7.1.4 Demonstrating Difference in Detail Between Field Note Account and Corresponding Diary Entry

Field note account

> *"Tuesday 3rd October 1995: Centre Community…*
>
> *Warm to hot – slight breeze to calm – no cloud.*
>
> *Spoke to Dana, been here two weeks, in office. Met and chatted to Lenny in office – he is assistant to the advisor. Chippy is not here – men seem vague about him. I spoke to old Henry. Old Henry, Bobby and Wally. Henry has agreed to take me to the top of western half tomorrow. Wally and Bobby will give me a dreaming story, creation of hill!!? In language – Henry will give me English version. Discussed the rates – he said $150 for all three. I checked with the store manager later and he said the men usually get the council rate of about $10 per hour. I said later to Henry that we would work on hourly rate – he seemed happy.*
>
> *1040 → 1305: Drive to next community – road generally okay – steady 80-90 km/hr.; 185 km. Had lunch outside store - ≈ 1400, went across to clinic and met Sally, the nurse. Followed her home to a bikky and tea. Has only been here two months. She gets 10 days off every three months. Lives in a nice, comfy house. Partner Greg is project officer. At 3pm I met Morrie, also new, but was at [Centre community] before.*

I met Bluey Brown, remembers JD – also met Willy Possum – they both remember Donna. S and Greg told me that local culture is very strong – Greg told me not to go over back fence because it's sacred land. – Also, a tourist drove around in a 4WD and was chased away by men armed with spears and boomerangs. Missed Rosie, she is very well liked by local people – she makes clothes for the kids and cooks cakes and biscuits for them. Morrie gave me four water bottles and one packet of cake to bring back for the grader driver, Bobby West – I eventually found him back at the [Centre community] – introduced myself and gave him the stuff – took a photo.[3]

Compare this with the diary entry which was written straight after I got back.

Diary entry

Travel to neighbouring community and back. Timings and fuel costs.

Admittedly, this is an extreme example of the two versions, but I think it gets the point across.

3.7.1.5 Explanation of Text Colour Coding

I found a useful tool for analysing the text was to colour code the identifiers (participant or gerund as appropriate) with a suitable colour that denoted the conversation type. My choice of colours was arbitrary. Figure 3.6 indicates the Talk Type colour coding scheme adopted for this study.

Figure 3.6 Talk Type Colour Code

Colour Code							
Talk Type	Social	Collaborative	Family	Project	Revealing	Cross-cultural	Collegial

[3] Note: the entries have been edited by using pseudonyms and generalised descriptors for place names to protect identity of people and Country.

I introduced this idea early in the analysis process, as an efficient visual cue for what was at times a very time-consuming task. It was satisfying to find that Saldaña (2012) recommends the colour code as a similar concept.

3.7.2 Gathering and Organising the Data

3.7.2.1 Data from the Original Study

For this study my data is comprised, in the main, of documents that were generated during my original field research book project. The gathering process of the original data body for the purposes of this current study optimised consistency and truthfulness – criteria recommended in the literature (Ellis, 2004). These gathered and processed documents give credence to my study and help support my findings. The documents are from the internal sources, my personal work diary notes, and more detailed field journals, spanning a period of ten years. There are no external sources utilised in this study. The two internal sources mentioned serve as a means of verifying data by triangulation (Chang, 2008).

3.7.2.2 Personal Work Diary Notes

In this section I explain the procedure I adopted for the research data collection. The data corpus – or collection of written language that was used for this research – is primary sourced from the cultural experts, the Aboriginal Elders and Traditional Owners themselves. It was derived from the first-hand accounts of my original fieldwork while working on location with the participants within each of the three Aboriginal communities. I should point out here that these accounts also include those conversations conducted over the telephone. I have not included those interpersonal communications conducted via letters and faxes. Emails did not figure, as the period under study was during the 1990s before email was

available. The literature on data collection tells me that when conducting primary-source-based qualitative research, data collection can be purposeful or theoretical, and raw data generally consists of text-based data that is gathered from interviews, focus groups, diaries, and so forth (Finfgeld-Connett, 2018, p. 8).

The diary entries were entered in different localities, home, workplace and the communities. The vast majority of the time, the diaries recorded several entries per day, pertaining to scheduled meeting arrangements, phone calls and faxes, to and from whom, messages and memos and, less frequently, cryptic to detailed accounts of discussions with participants who were involved at varying levels of the project. The prodigious size of the primary data was reflective of the original 'From Country to Classroom' fieldwork period. I am defining 'fieldwork' to include not only the actual time spent in the community with the participants, but also the community-directed phone calls, which in the main were made from home or from my workplace. Basically, I am looking at all the verbal communications that transpired, not just the face to face. The time spent in each community varied, and basically reflects the complexity of logistics, time and expenses involved with travel to each one.

3.7.2.3 Use of Colour-Coded Talking Types as an Analysis Tool

I decided to incorporate a colour-coding scheme to facilitate for analysing the type of discussion/talking used. In the example from 3 October shown above, the names are coded blue for social chatting and banter, mauve for collaboration, and orange for discussion bridging both Western and Aboriginal world views, or cross cultural in context. Where a particular discussion involved two modes of talking, the participant's name colour was a combination. In the above field note passage it will be noted Dana is both blue and mauve indicating we engaged in some social chit-chat and also working together, some joint action

for a mutually desired outcome. The colour coding assisted with consistency of definition across all three communities, and improved accuracy of total count for each entry.

An example of this is extracted from my diary 25 September 1995. I've displayed the colour coding adopted for the talking types, which assisted with the analysis process.

> *8pm: Leave club, sitting briefly with Pam and father James (introduced to him). Mack and his wife and Danny get a lift home – At Moses' house I meet Andy and I say a quick hello – take Danny on to his sister's house, who is a teacher at school. (Has done a course – level three, at Batchelor. I asked her if I could see her tomorrow – says yes.) I then spent 30-40 minutes talking to Danny – he has trouble articulating some of his thoughts, but seems very concerned to maintain culture in younger generation, and he sees it as his responsibility as Traditional Owner (TO) to assist with this. I'm introduced to father, Michael (magpie goose in hand), and his youngest brother. Concerns raised that today's boys are not getting the same knowledge as he did – Jack said same thing. Discussion moved onto the boys working as rangers in the Mimosa eradication program…*

In the above case, I have retained my coloured font tool (which I found extremely helpful for the analysis). My conversation with Penny and James merged both Social and Family types. We were talking about family as well as some community social talk. Driving Mack, his wife and Danny home was routine, and always provided wonderful opportunities to get to know them better and allowed them to see another side of me, not just the balanda teacher. I coded this session as both Social and Family, again because of the mixed content. My Yarning with Danny's sister was initially a mix of Social and Family, but then became

Collaborative where she accepted my request for a meeting at school. Danny was the Community Traditional Owner, and this lengthy conversation reflects his worries about family and community employment opportunities and loss of culture, hence accordingly, I coded this as a mix of 'Family' and 'Revealing'.

3.7.3 Comparison Between Diary Entry and Field Notes

3.7.3.1 Introduction

The process for gathering and preparing the field notes was conducted similarly to the diary entries. The field notes invariably were recorded in situ, within the communities. Generally, the field notes were recorded at a later stage, after I had had a chance to mull over the events and recall additional details. The correlation in content between the diary entries and field notes was high, with greater detail in the field notes benefitting from more time to reflect on the events.

The field notes were a necessary measure for recording significant events and activities, particularly where I had been involved in information and detail-rich verbal communications with one or more of the key participants. I would write down snippets of conversation, of what I'd been told and what I'd said. I avoided use of emotive descriptors but, did occasionally record what my feelings were at the time, in an attempt to capture the moment for posterity. In the main, and on reflection, my writing of actual conversations signified a key event. These were associated with moments that were pivotal in the course and evolution of the original research project, and at the time were marked by extremes of emotion ranging from absolute dejection to sheer elation. By this, I mean reaching a turning point, a moment of crisis, and conflict situations that would require resolution.

3.7.3.2 Describing the Difference between DDEs and FNs

As outlined earlier, DDEs refers to the detailed diary entries while FNs are the field notes.

I found repeatedly that the two different entry formats, corresponding to the same date, may at first glance seem the same, but a closer reading reveals the greater, more subtle detail, perhaps nuances, for the field note entry. The field notes were invariably written at a later stage, after I had collected my thoughts more. I had had time to read over the earlier diary entry, picking up details that had been missed the first time.

3.7.3.3 Detailed Diary Entry (DDE)

An extract of the diary entries follows

> *06JUN97: "Top End Community: 08:00, Climbed [the hill] and got some good photos of town and billabong. Also, jointing etc. A tourist group came up just as I was leaving, the guide lives next door in flat – he saw me tonight and said he wanted to talk to me tomorrow – I said that Donny had okayed it, but it didn't seem to matter.*
>
> *10:00, Outlier, in front of soak – saw Jacko on way and got okay from him, after having spoken to Donny at council. The climb up the outlier was uneventful, photos should be okay – surprised that there was such a span – would be at least 180° though. Had to get key off Laurie – he was a bit surprised to see me when I approached him out in paddock, but he soon realised who I was, then became very helpful. Climbed [another hill] this afternoon but cloud cover was disappointing – waste of time.*

Swam as per usual and went to club – [Donny] was up to his old tricks – wanted [to borrow] $20 and is becoming quite persistent – eventually gave him $10. [Tod] also botted $20 – I'll include this in his fee for the drawings.

Drove back to flat for tea and then went and picked [Tod] up. He's a frustrated man – quite well-read, educated at [private school] and Darwin H.S. – not so sure about the idea of taking his culture down to the 'southerners' – he's not convinced that Koories are real Aborigines[4] *– as he said they have white ancestors, and he pinched his arm to emphasise his black skin.*

Spoke to [Jacko] and [Ray] briefly at club – will see them tomorrow at 9 o'clock – will go over the sheets with them.

3.7.3.4 Field Note (FN)

The corresponding field notes for the same day

Friday 6 June 1997: [Top End Community] Field Notes (KEY EVENT):

8am: Climbed 'The Hill' and got some good photos of the town and the billabong. Also, jointing etc. Found that a tourist group was also at the main gallery. They appeared just as I was leaving, I tried to be as inconspicuous as possible. Was conscious of their guide. He lives next door in the rectory, and he approached me later in the evening buoyed by alcohol and expressed concern about me being up there. I was not sure

[4] I would prefer to continue to use the term Aborigine as this was the preferred term at the time when I was conducting the initial research and recording my diary entries and field notes. Hence all quotes from my diaries and field notes retain Aborigine. Indeed, Aunty Irene made it very clear to me on one occasion, telling me that that they were Aborigines, and not Koories, who were from NSW.

what the implication was, money lost, not sure? Said he'd see me tomorrow to talk to me, but never did. I mentioned that I had Donny's permission, but it didn't matter.

The climb up the outlier was uneventful. Photos should be okay. Surprised once again at the angle of span for the panorama. Had to get the gate key off Laurie, while out in the paddocks, he was a bit surprised when I approached him, but soon realised who I was and then became very helpful. Climbed another hill this afternoon, but cloud cover was disappointing – a waste of time. Swim as per usual and went to club. Donny was up to his old tricks, wanting $20. He is becoming quite persistent. Eventually gave him $10. 'Tod' also botted $20 – I'll include this in his fees for the drawing.

Drove back to the flat for tea and then went and picked Tod up. He is a frustrated man – quite well read, educated at a private secondary college and Darwin High School. He's not too sure about taking his culture down to the southerners – he's not convinced that Koories are real Aborigines – as he said, they have white ancestors, and to emphasise his point he pinched his black skin on the forearm. He referred to an Aboriginal colleague from south, and I defended the Koories by saying that they could not help the loss of their culture by the whites. They believe they are Aboriginal and that's that. Spoke to Jack and Ray briefly at the club – will see them tomorrow at 9am – will go over the draft sheets with them.

3.7.3.5 Summary

As examples, these two extracts perhaps demonstrate the advantages of writing field notes, which essentially mirror the happenings for the day. But, and critically for my needs, the field notes, often written sometimes several days after the events, were an opportunity to dwell on and delve further into the field trip happenings. By their nature, the field notes were more reflective and became reflexive exercises, providing for the subtleties and nuances not evident in the diary entries. These notes, plus my memory of previous events, were my source of feedback, all of which served to guide my behaviour, aligning my ways to better conform with the Community mores and conventions, adjusting and re-adjusting towards doing things the proper way.

The in-field encounter with the tour guide had worried me. I hadn't met him before, and he wasn't part of any of my social networks. This was another lesson for me, things were changing in the community with respect to visiting the rock art site. Commercialisation was creeping in, and apparently my independence was going to suffer. My encounter with Tod was also a surprise, after all, he had been working with me as part of the Traditional Owner group for some time. Still, his views about the inter-sharing of Traditional Knowledge between communities, although personal, were relevant. In the field notes I give further details about my response. I was actually quite indignant, and felt I had a duty to speak up for the Southerners. Tod, I think, understood and accepted what I had to say.

I wanted to learn from these emotionally charged experiences and improve on just how I went about conducting myself in future community visits. I always felt that I owed this to my participants. The field notes allowed me more time to process events and to provide further details about those evocative events that warranted an emotive overlay. An objective cryptic account just would not do.

3.8 Methods of Data Analysis

3.8.1 Autoethnographic Analysis of Data from the Original Study

Transferring the handwritten notes into Microsoft Word format – from analogue into digital – was an extremely time-consuming task. In all, after two months and some 49,136 words later, I was set to commence the data analysis stage of the journey. Once gathered, separated and categorised, the data was used to provide the physical details, events, thoughts, descriptions and even dialogue to help in the process of 'emotional recall'. This is a process in which the researcher engages in an intense reflection on a specific event or memory (Ellis & Bochner, 2002). This emotional reflection is an important aspect of the data analysis. It is necessary for selecting which events will be retold in the narrative, and which will be deemed unnecessary. It should be noted that out of respect for participant privacy, the names of all participants were changed in the narrative.

Because my goal was to generate new theory about developing cross-cultural science curricula from primary source Traditional Knowledge, classic grounded theory and the accompanying 'Process' or Active coding was the recommended choice (Saldaña, 2012, p. 75). Process coding is particularly useful for researching the routines and rituals of human life, plus the rhythm as well as changing and repetitive forms of action-interaction plus the pauses and interruptions that occur when persons act or interact for the purpose of reaching a goal or solving a problem (Corbin & Straus, 2015).

After the initial transcription of the diary entries and field notes onto the spreadsheet, the process of writing the analytic memos took place. This process ensures the analysis remains grounded in the data and not in speculation (Saldaña, 2012, p. 195). 'Analytic memos are used as an analytic strategy to permit the researcher to achieve abstraction while remaining true to the data' (Birks et al., 2008, p. 74). In the second cycle of coding, the active

processes or gerund or '-ing' codes were developed to form the categories selected. Each category was assigned a column in the spreadsheet and where the presence of that category was observed it was recorded. These frequencies were used to provide percentages as a means of providing contextually based richer, thicker description of the narrative account.

3.8.2 Personal Work Diary Notes

3.8.2.1 Preliminary Discussion

After working through the early stages of the analysis, I became aware that a key aspect of the data was the omnipresence of verbal communications between me and all participants within each community. When I referred to the literature, (Johnson & Dempster, 2016; Okkonen et al., 2018; Wagner, 2005), I found the terms 'talking' and 'enablers and restrainers' appeared to have a strong connection to what I was reading, remembering and able to associate with the myriad of past events to do with the community-based fieldwork. Indeed, Wagner (2005, p. 99) concluded from her research that the main enabler for partnerships within the Community was '… the establishment and maintenance of networks'. I realised that these two concept sets were highly appropriate to the analytic process. Saldaña (2012, p. 276) refers to this strategy of internalising and transporting past recollections and memories of powerful experiences to the present as the 'touch test', where I was progressing from the 'topic to the concept, from real to abstract, and from the particular to the general'. The choice for analysis coding was guided by Saldaña (2012). I made the decision to filter for 'actions' on my, and the other community participants' part. Coding for action words, words ending in '-ing', also referred to as Process coding.

A fitting choice towards answering my research questions, all related to the hows, whys and wherefores behind what went on in the overall process of transferring Aboriginal knowledge from its primary source, from 'Country to the Classroom'. Process coding in turn

develops into concept coding, a method that lumps data together (Saldaña 2012, p. 25) and can be used as a single coding method design for developing new knowledge. The concepts – words that symbolically represent a broader set of meanings and provide for a 'bigger picture' – which I ultimately decided on were 'modes of talking' and 'enablers and restrainers'. These two concepts represent specific sets of actions or processes that were in evidence across all communities and emerged as underlying key agents that mirrored change and social dynamics.

I also found data coding to be at times both a significantly moving and immersive experience, and this accords well with what Saldaña has to say (2012, p. 41). There was no on/off switch involved, rather a more sustained momentum of evocative energy, nothing predetermined or deliberate in nature, just a progressive immersion into the past, reliving many experiences and events that were often accompanied by considerable emotive loading. These reflexive experiences accompanied the finding that my coding categories first emerged as 'gut' feelings, almost instinctive or, as Saldaña writes, 'The best approach to coding is to relax and let your mind and intuition work for you' (2012, p. 219). Each progressive stage of the analysis coding was accompanied by a reflective moment followed by a time for reflexive thought, seeking accuracy, sensitivity and honesty within Self.

What I found interesting was observing plenty of evidence of this 'two-step' procedure in my original notes. Firstly, reflecting on a particular event and then noting a reflexive comment, in an attempt to improve on my working routine within the community, forever trying to improve on doing things the 'proper way'. All of this would translate into observing for 'action' categories and was accompanied by analytic memos. I would then ponder reflexively over these, look for ways to develop these categories and memos further,

brainstorming for possible themes and behavioural patterns, focusing down on the phenomena, the conceptual process under consideration.

Ellis and Bochner (2000, p. 752) refer to the process as ‘emotional recall’. These powerfully rich memories triggered by the text came as a complete surprise, but I soon understood that this was all part of the immersion process. As Ellis (1999, p. 675) points out, ‘If you can revisit the scene emotionally, then you remember other details’. I found that writing close to the scene as I did with the diary entries was advantageous as it enabled accessing and capturing the emotions, but it also had its drawbacks. It sometimes meant that I could not emotionally detach myself sufficiently from the scene to ‘analyse for its cultural perspective’. The revisiting of these scenes twenty years later was a culturally immersive experience, ‘opening up additional reflexive voice’ (Ellis & Bochner, 2000, p. 744).

3.8.2.2 Explaining the Analysis of Complex Discussion from a Single Diary Entry

A single entry for one day may have described complex movements between different locations, involving one participant. The entry would characteristically describe two or more different settings with a different context and purpose for each. Such was the dynamic of personal interactions during the community fieldwork. As an example, on 24 July 1997, I spent the whole day with Uncle Tom, doing fieldwork at three different locations, each for a specific purpose. Location one was on a flight over Country including the drive to and from the airfield, location two was at his home and location three was a cultural site. For entries such as this I recorded and analysed for three separate sets of discussions, each with a specific mix of types of conversation.

3.8.2.3 Personal Work Diary Notes – Analysis by Stages

The progression through the stages was not pre-determined, but was often intuitive. The analytic pathway did not follow a unidirectional route. Frequently, I’d look back at the

previous stages, with an eye on continuity, both in kind and logical progression. The preceding stage was essentially the jumping off point for the following.

Stage one took four full weeks to write the Word documents with comment columns. I used this strategy to identify significant events. This was an important first step as it allowed me to identify actions, behaviours and concepts using a mix of adjectives, action verbs or gerunds and nouns. These were either a word or short sentences that identified with and focused upon a specific aspect of the entry. In retrospect, Stage one served as an important entry point into the analysis. It sensitised me to the experiences of some twenty to thirty years ago. It was an immersion process that was essential for re-engaging and revisiting the past, further strengthening my memories of past events, sensitising my interpretations of the talking process. I adopted Saldaña's (2012) recommendation for utilising a colour code denoting the different forms of conversation evidenced in a given entry. With practice, colour coding the appropriate words became easier.

Stage two occupied nearly two months. To initiate this stage, I transferred the text from the diaries to a two-column table format again using Microsoft Word. By this time, I was comfortable with the concept of analytic memos (Saldaña, 2012). As a consequence, I used the right-hand column to enter memos pertinent to the text. I also inserted a comment column to the right side once again, which I found very useful for further condensing the memos. The comments made for each entry were then profiled as categories to be used later in the analysis.

At this stage I introduce Microsoft Excel spreadsheets as an analytic tool, cutting and pasting the Word files to Microsoft Excel spreadsheet format. Prior to this research I already had a basic working knowledge of the software and was aware of its potential for assisting with large amounts of data. My decision to proceed this way again accords well with

Saldaña's (2012) recommendations. It is a recognised method, allowing for greater potential for sifting out finer details pertaining to behavioural aspects of the community related work. It opens up opportunities to commence counts of categories chosen for analysis.

Time trends are easily determined as a frequency or prevalence, opening up opportunities to link concepts such as talking types to location and participant. I appreciated the ability of the spreadsheet format to conveniently and clearly share the workload, to expedite the analytic process was welcomed. As an example, I would read and then re-read an entry looking for evidence of a particular category and enter a numeral one into the appropriate column. For efficiency and accuracy's sake, I collated all entries pertinent to each community, and set up a separate spreadsheet for each. I had used the same work diary for all three communities. Constructing a separate spreadsheet for each community provided the necessary continuity and facilitated both the immersion process and the analysis.

Stage three occupied about two months. I had realised the need to limit the research to the communities, reducing the data corpus to a more manageable size. My focus from this point became entirely on the primary Aboriginal knowledge source conveyed through my interactions and communications with the Aboriginal Elders and Traditional Owners. As a consequence, all references to the extra-community social support networks were removed from the study.

Stage four was accompanied by a decision to further broaden the category field to fifty. I made the decision to confine the research analysis to the communities, with all interactions external to the communities to be excluded. The only exception to this was when I was communicating with externally located scientists and other experts who were directly involved with the community's fieldwork. My first decision post-'extra-community exclusion' was to broaden the scope and range of the categories from 30 to 56 by exploring

for gerunds (action verbs), examples of which kept cropping up in my community-based diary entries. I devised a scale by which to gain some measure of my social support networking, which evolved over time. Hence, the adoption of ‘initiating’, ‘building’, ‘maintaining’ and ‘extending’.

Stage five involved analysing the more detailed diary entries, for which I had decided, as a practical and more efficient measure and for convenience, to create specific spreadsheets. This provided for greater continuity and smoother transition from one set of entries spanning several days over a particular visit, to the next visit – a gap of between one and three months. It also enabled me to better embrace the mindset associated with the community’s cultural framework. In short, to immerse myself. Stage five provided the opportunity to analyse the entries related to the evolving status of my social support network, and for the associated gerunds, indicators of specific actions and events that marked and defined the field research journey.

Stage six commenced out of my realising a clear need for a closer focus on, and deeper analysis for, the types of interpersonal, social interactions between me and the other participants. Saldaña (2012, p. 51) refers to meta memos that tacitly summarise, integrate what has been observed and developed to date, and for me evinces a reality check. Social interactions that related to meetings, visits to cultural sites, catching up and socialising with family, and working collaboratively with, and alongside the key participants within the community or out on Country.

Stage seven was transformative for the analysis. I created an individual spreadsheet for each community, breaking down the overall data corpus into more manageable units. I then inserted these, by cutting and pasting the same set of analytic memos generated during the previous stages, into a column to the right of the entry text column. This initial step was

followed by inserting three-colour-coded groups of columns to the right of the memo column, each set representative of one community. Light green for the Top End, ochre brown for the Centre and light blue for the Southern community. All emblematic. Within each of these colour sets were columns for each participant that I'd had significant interaction with. In all, totalling 132 people across all three communities – and given the fact that there were also 5,247 rows for the analytic memos, this meant a spreadsheet that was, well, mind-boggling. A lot to be said for Microsoft Excel's capabilities.

Stage eight involved analysing further for the types of social interactions with the community's main participants. Firstly, I continued the pattern previously established by creating spreadsheets for each community. Basically, this amounted to establishing new columns that targeted for the different ways of speaking to and engaging with the participants. The verbal communications were analysed for topic and context, leading to the categories 'Social', 'Family', 'Research', 'Emotional', 'Cross-cultural' and 'Collaborative'. I also linked interaction with location, over the ten-year period. This then enabled me to link a participant community member's role in the original project to the mode of communication and to the location where the interaction transpired.

Stage nine was conducted without spreadsheets. This stage was not envisaged until late in the analysis phase. I sensed a need for delving further into the more subtle factors underlying and accompanying the original research fieldwork within the three communities. As stated previously, my intention has been to be open and honest with the reader about the total experience underlying the original work. My handwritten diary entries and field notes sometimes provide explicitly detailed accounts describing either my own personal feelings or those of whoever I was relating to at the time.

Acknowledging these powerful moments was an ethical issue, as non-disclosure would have been dishonest. Consequently, I decided to hunt around for signs of the emotional underlay. There were times that were uplifting and invigorating and were usually associated with enabling factors that were distinctly positive, reinforcing and affirming. At the other end of the spectrum, however, were the 'Downers' – events that transpired that were associated with periods of self-doubt, loss of confidence and uncertainty about the project's future. Hence, for the purposes of this study, I routinely wrote down and recorded those episodes where I distinctly recalled those dynamic and colourful moments. I used a Microsoft Word document to record these memories of evocative, emotionally charged moments and used a comments column to translate and analyse each experience for their Enabler or Restrainer characteristics.

3.8.3 Explaining the Analysis of the More Detailed Field Journal Notes

The data analysis for the field journals evolved over a series of distinct stages, similar to the Diary entries, and essentially using same process and sequencing. The experience behind the diary analysis proved a good basis for this next stage of the work. The field notes were not as extensive as the diaries because they were not recorded on a day-to-day basis, so consequently the data body was significantly less, meaning smaller and more manageable spreadsheets. Typically, I used field notes for the 'heavier' days, where lots happened in a short time frame, and when things that happened were sufficiently different for me to learn and digest.

On these busy days there was simply too much to record directly, I just needed additional time in a quieter space to ponder and reflect. Applying the coding process was also a journey of discovery in itself. Once again, I initially used a comments column in the Word documents alongside the text from field notebook entries. I found this to be an effective tool

for searching for and then recording recurring behavioural patterns, thereby enabling me to start directly linking these behaviours, human actions, to other concepts.

An example of categories and themes was the one related to the prevalence, frequency and way in which I spoke to the participants. Early in the analysis I started to wonder if there were any connections between time spent in community, the location, frequency and type of interaction with people. Some analysis stages were dead ends leading nowhere, but that is the nature of the beast. I realised early on that I had to remain open minded and be prepared to patiently tease out and follow all possible leads rather than remain focused on one or two.

As with the diary entries, I adopted an inductive approach, nothing presumed or aimed for. I tended to keep the work on the field notes separate to the diaries – but learning from the diary analysis expedited matters. My mindset when writing the diaries was often very different to when writing up the field notes. They were separate events, hence I keep separate the analysis needed to reflect this as well.

Stage one was exploratory, again creating Word documents with comments columns. As with the diaries, I used this strategy to identify key and repeating concepts, actions and behaviours. I broke the body of the text up into manageable portions (Saldaña, 2012).

Stage two again saw use of a two-column table format, using the right-hand column to enter analytic memos pertinent to the text. I also inserted a comment column to the right side once again, for further condensing the memos. The comments made for each entry were then profiled as categories to be used later in the analysis.

Stage three involved very little work as the field notes contained very little reference to the extra community research involvement.

Stage four also involved increasing the category field to fifty, by exploring for gerunds as additional categories.

Stage five involved a deeper analysis of the types of interpersonal, social interactions between me and the other participants.

Stage six was a lengthy task, involving a separate spreadsheet being created for each community, simply to break down the overall task into more manageable units. I adopted the same three colour-coded groups of columns to the right of the memo column, each set representative of one community. Within each of these colour sets were columns for each participant that I'd had some interaction with.

Stage seven involved spreadsheets, analysing further for the nature of my interactions with the main participants. This stage took less time than for the diaries because the field notes tended to focus more on the Traditional Owner, Elder and 'facilitator–liaison' participant. The verbal communications were analysed for topic and context, leading to the same categories 'Social', 'Family', 'Project', 'Revealing', 'Cross-cultural' and 'Collaborative'. I also linked where the particular conversation took place.

Stage eight was conducted without spreadsheets. It involved recalling from memory the emotionally charged events that accompanied some of the more socially dynamic occasions in the community. I used the same categories, 'enablers' and 'restrainers' for the analysis.

3.9 Thematic Analysis

3.9.1 Introduction

The literature describes autoethnography as a form of qualitative research in which an author uses self-reflection and writing to describe and systematically analyse personal

experience in order to understand cultural experience (Ellis et al., 2011). I am further informed that thematic or content analysis is largely used to analyse the raw data when conducting primary qualitative research. When conducting theory-generating research, however, data analysis must push beyond mere coding and categorising. In these instances, data analysis must also involve explicating relationships among concepts to generate process frameworks (Finfgeld-Connett , 2018, p. 8). I have attempted to remain consistent with a grounded theory approach to my data analysis by adopting a process framework. And, initially, my goal of coding was to inductively organise the raw data transparently, to ensure the early codes remained close to the data corpus (Finfgeld-Connett , 2018, pp. 34–35).

My decision to immerse this thematic analytic coding tool within an evocative autoethnography is supported by the literature (Anderson, 2010, 2011; Pace, 2012). Anderson's analytic focus is on developing theoretical explanations of broader social phenomena, whereas an evocative autoethnography focuses on narrative presentations that open up conversations and evoke emotional responses. Hence, one of the valuable attributes of an autoethnographic approach is its ability to seamlessly coalesce more than one type of methodology. The data obtained from the analytic autoethnography has been explored using thematic analysis. I found Braun and Clarke's (2008, 2016) material to be a valuable resource. Thematic analysis will be used to mine the narrative for themes and any artefacts of significance.

The thematic analysis method provides flexibility, is essentially independent of theory and epistemology and can be applied across a range of theoretical and epistemological approaches. Although often (implicitly) framed as a realist/experiential method and further, 'Through its theoretical freedom, thematic analysis provides a flexible and useful research tool, which can potentially provide a rich and detailed, yet complex, account of data

(Aronson, 1994; Roulston, 2001 as cited in Braun & Clarke, 2008, p 78). It has been my intention to provide as rich a thematic description of the entire dataset as possible, so that the reader gets a sense of the dominant themes. This is particularly important when investigating an underresearched area such as in this case (Braun & Clarke, 2008, p. 83). My approach to the analysis will be inductive, meaning that I will be coding the data without trying to fit it into an existing coding or theoretical frame. The research process for this study has involved a meticulous and time-consuming analysis by Process Coding, through a series of cumulative coding cycles that hopefully will lead to new knowledge, a theory 'grounded' in the original data (Saldaña, 2012).

My initial decision to adopt Process Coding was based upon my quest for new knowledge, knowledge pertaining to and implying broader concepts associated with human processes and actions. (Saldaña, 2012, p. 111). And since my goal was to develop new theory about actions or processes, I made the choice recommended by Saldaña (2012, p. 75), to opt for grounded theory, a methodologically systematic approach that is suited to inductive, qualitative inquiry. I should note here that within the coding process was the ongoing use of, and interrelationship with, analytic memo writing. 'Coding is simply a structure on which reflection (via memo writing) happens. It is memo writing that is the engine of grounded theory, not coding' (Gordon-Finlayson (2010) as cited in Saldaña, 2012, p. 55).

The first stage of a thematic analysis involves trawling through the entire data body, familiarising oneself with the content. The codes then generated identify the important elements of the data, which assist answering the major research question. The next phase involved searching for the themes by examining the codes and collated data to identify significant broader patterns of meaning or potential themes. The themes are then reviewed, refined and eventually given an informative name. The final phase involves the writing up,

weaving together the analytic narrative and data extracts, and contextualising the analysis in relation to existing literature (Braun & Clarke, 2008).

Thematic coding does not allow for claims about language use. As Braun and Clarke (2008, p. 97) point out,

> ‘Unlike narrative or other biographical approaches, you are unable to retain a sense of continuity and contradiction through anyone’s individual account, and these contradictions and consistencies across individual accounts may be revealing. In contrast with discourse and conversation analyses, a simple thematic analysis does not allow the researcher to make claims about language use, or the fine-grained functionality of talk’.

Saldaña (2012, p. 27) corroborates these views, ‘Paradigmatic corroboration occurs when the quantitative results of a data set do not simply harmonise or complement the qualitative analysis but corroborate it. In other words, the quantitative analytic results ‘jive’ with or appear to correspond with the qualitative analytic outcomes’. Hence the rationale for combining thematic analysis within the overarching autoethnographic methodology, by combining their attributes, one complementing the other.

3.9.2 Theming the Data

I agree with Saldaña’s (2012, p. 204) opinion that simple ‘cut and paste’ in multiple arrangements on a basic text editing page to explore for possible categories and relationships is an intriguing way for theming the data. Originally, I used a three-column format for the thematic analytic work, using Microsoft Word files. An example is given in Table 3.2 The left, wider column of the page contains the diary or field note transcript; the middle column contains the themes chosen for the analysis; the right ‘Comments’ column was used for initial

notes, keywords and shorter codes. The themes in the centre relate directly to the goal of the study.

Table 3.2 Extract from Theming the Data Analysis

Diary Entry	Theme	Comments
0930 – Interview with 'Jack' – In shade of banyan tree outside home – wife set sheeting on ground, went very well, good response from all.	Talking research at home, with a good response.	Conversation, project, interview, positive, outside, good responses.

Note: edited to protect privacy.

Rather than maintaining the text data as long unbroken passages, I separated the text into shorter paragraph-length units with a line break between them. I attempted to break up the passages whenever the topic or sub-topic appears to change (as good as you can), because in real life 'social interaction does not occur in neat, isolated units' (Glesne, as cited in Saldaña 2012, p. 19). The necessity for this task only applied to the field notes, which tended to be longer and interrupted passages of text. For the diaries, the entries themselves were in the main only short paragraphs at the most in length.

3.10 Ethical Considerations

One of the main features of autoethnography is its emphasis on the self, and it is this specific feature that entails the problematic ethical considerations of the method (Ellis, 2007). As a personal narrative is developed, the context and people interacting with the subject start to emerge in the reflexive practice (Ellis & Bochner, 2000). It is at this point that the problem of obtaining (or not obtaining) consent to be included in the narrative has to be considered (Miller & Bell, 2002).

In a study of this nature, the need to address the vitally important dual issues of confidentiality and ethics is compelling (Bainbridge et al., 2013). As they point out, in a community research work setting, both perceptions and expectations can differ between Self

and Others. I was reminded of this time and again when reading back over my old diaries and field notes from the original project. My study was both informed and guided by the NHMRC (2018) resource document and the AIATSIS Code of Ethics (2020), both of which provided a framework for the work. Understanding just how to translate ethics theory into practice in the field of cross-cultural research in the Aboriginal Australian world is impossible without the guidance of Aboriginal people and this thesis demonstrates the importance of this aspect throughout the study. I also sought guidance through reference to work by authors such as White and Fitzgerald (2010) and other scholars.

I remain very conscious of the nature of my interactions with the participants, and of my ethical obligations to them. While I've always done my best to ensure that participants suffer no harm during data collection, I'm sure it can happen without me realising it. Upon reflection, I think that part of my education and mentoring in the preferred ways for me to communicate with the Aboriginal people I was working with was that if I did something wrong or didn't do things the proper way, someone would have let me know. No one at any stage indicated they felt harmed by my research processes. I have wondered at times if those that felt they might be harmed did not ever offer to be involved in what I was doing in the first place.

Furthermore, during the recent gathering and organising phase of this study I have taken all measures to protect the participants' privacy by non-disclosure of names and communities. Also, ethics approval was gained from Monash in June 2019, approval number 13009. Permission for use of the original data for this current study was then obtained from either the original participant or next of kin, during community visits conducted June and July 2019. The participants were aware of why the data was being collected and what it was to be used for, and they remain very supportive of the research.

Several of my colleagues, with many years of experience working with Aboriginal people in communities, mentored me on working ethically within the community, being patient, listening actively and not being intrusive. As Michael Christie (2008) has pointed out, when working with Aboriginal people, time-related matters related to quantity achieved, are very much secondary to the quality of your work. One of the main features of autoethnography is its emphasis on the self and it is this specific feature that entails the problematic ethical considerations of the method (Ellis et al., 2011).

3.11 Conclusion

In this chapter I have referred to the literature relevant to the overarching methodology, autoethnography. I've also described the process of data collection and data analysis. While the main thrust is essentially an evocative narrative spoken in the first person, there is also a quantitative dimension provided by a thematic analysis. I am confident that the chapter provides the necessary springboard for tackling the following chapters. I would also like to apologise to the reader for the inordinate length of this chapter. Achieving a balance between length and adequate coverage proved challenging**.**

In the next chapter I will provide a description of the analysis of my findings. I commence the chapter by acknowledging the epiphanic beginnings to this study. I follow on with a detailed account of the stages in social networking development observed within each Community. My focus then turns to the various conversational types and their signifiers. These conversations are then explored with respect to their situational context within Community and country. The chapter ends with a description of the effects of the enabling and inhibiting influences affecting the Community work in the co-creation of Indigenous science knowledge from Country to classroom.

4. Chapter Four – Analysis of Findings

4.1 Introduction

I begin this chapter by confirming the two-pronged approach to this study, being in part a qualitative evocative narrative approach that explores the nuances and subtleties underpinning the data collection and underscoring the journey, and a parallel, complementary, qualitative method that explores for the themes and patterns of behaviour that emerged from an analysis of the frequency counts. Both approaches occur in parallel, with one complementing the other, and together provide a comprehensive analysis of the research journey. In this chapter, I will discuss the findings arising from the two-pronged analysis of the data corpus. As detailed in Chapter Three, I have adopted a dual research methodology. One, an overarching autoethnography, using an evocative narrative style to deliver a retrospective account of my book research journey. Two, a thematic analysis method to delve more deeply into the data strands taken from my diaries and field notes. This combined approach has provided a source of detailed information related to my interpersonal dealings within each of the three communities.

In brief, the majority of the findings relate to the face-to-face verbal communications with the key participants in each of the three communities, with a very small percentage of conversations conducted over the phone. In the main, the participants are Aboriginal people with direct traditional ties to the Community and surrounding Country. Where white people, whether ‘Balanda’ or ‘Gubbah’ (the terms used by the Aboriginal people for ‘white’ people in the Top-End and Southern communities respectively), played a significant transforming and constructive role in the original research, then they have been included as well. The findings further explore the various types of verbal communication that took place, and where they took place. Further to this I have also analysed the verbal communication styles at a

personal level, since the findings indicate that the breakdown of verbal communication type aligns with the role that person played, and the way in which they contributed to the original work. Each separate community location identified in this study was a hub of activity specific to a part of the book's development. The conversations conducted were either directly connected to the book project or they provided an indirect link, in an ancillary but important supportive social role, indirectly connected to the project.

4.2 The Philosophical Fundamentals

The findings from this study reflect on my relationships with the participant Community members, as co-worker, friend and family member, and what I learnt in the process, what they taught me. I like to acknowledge them as team players because they, like me, knew that we were all working together to produce a book – their book – as part of a shared enterprise. The more educated of these team players also knew what the underlying purpose of the 'game' was. It was all about sharing their Traditional Knowledge in a secondary-level Earth Science text aimed at achieving some degree of balance and equity in what is taught to our secondary science students, to provide for them an alternative to the 'Western' perspective traditionally taught in schools. The book was also a reconciliatory educational tool, as I was reminded by Jack, Annie and other key Community players who referred to the book's potential for bringing us all under the one 'umbrella', Black and white together.

I should, for the reader's sake, acknowledge the essential role played by the Aboriginal participants, and that this research study is fundamentally about my engagement within Aboriginal social groups, the families and individuals and the networks that embraced them. Without these networks the original book-related work would have never been achieved. The network groups were in essence the platforms from which the essential work

was conducted over the ten-year period. These networks nourished and nurtured me, and provided the essential earth from which the book germinated, flourished and was eventually published. My hope is that this study will provide a rhizomic effect where the teaching and learning will extend beyond the original Community setting.

So, strategically speaking, the core dynamics of the original book fieldwork involved participants, either individually or as a team, that belonged to distinct social groupings, each interrelated to the others as integral parts of the whole community. Each of these groups had a particular role to play in terms of meeting my needs for the fieldwork. One major component of these interactions were friendship- and companionship-based and were represented by the social and family group engagement and conversations, interactions that made me feel welcomed and gave me a sense of belonging, where I was made to feel part of the family. Another major part of these interactions was connected to the collection and recording of the primary-sourced data. This fieldwork involved conversations and discussions centred around the preliminary arrangements leading to the cultural site visits, the visits themselves, and later, the necessary reviews and feedback of the draft materials. All these conversations were more collaborative, and research-based in nature. Around these two major conversational components were other less frequent types of talks.

4.3 An Epiphany

Throughout this chapter, I will refer to findings related to experiences that can only be described as, special experiences that were associated with a sudden realisation of how lucky and privileged I was, and often were pivotal moments that turned things around, breathing fresh life and invigoration into my journey. The summative effect of these experiences has been life changing in terms of shaping my attitude, awareness and perceptions of Aboriginal Australia. The first, and most startling of these experiences was that wonderful realisation on

my first visit to the Top-End Community when I saw the potential for synthesis of new knowledge, bridging two worldviews. With startling clarity, I saw what lay ahead of me, accompanied by an urgency and enduring drive to get the job done. This internal drive remains with me while undertaking this study. If that original book project was a 'bug' then I was well and truly bitten.

Kien (2013, p. 578) explores the nature of Denzin's notion of an autoethnographic epiphany as, '…an identifiable moment of lived experience that one can identify as a turning point in one's understanding of oneself and one's relationship to the world'. In many of my 'turning point' moments I had stalled in my fieldwork and was sometimes desperately reaching out for help and guidance, usually because of an impacting restrainer blocking my path. These moments were usually accompanied by intense personal anxiety and frustration. One memorable epiphany occurred when I was invited to visit Aunty Polly from the Southern community at her home. I had been meeting resistance from her family and was hoping this visit might smooth the way ahead.

Extract from Diary, Saturday, 3 June 1995, Southern Community

> *1030–1130 Talking to aunty Polly: She initially asked how I was going to do the project. How do you combine science with Aboriginal culture? She said later she didn't like the term Koorie. Seemed very interested in the map – quite impressed. Spoke of Jimmy – Jimmy has knowledge from his Granny – only son. Aunty Polly talked about the Net-Net – small wild people still living in the forest. Her father and his brothers had seen the small people – dressed in rags, long hair – would run off into bush around the Mission. She commented about the demolition of the Anglican church at mission in 1950s – a sad loss, effectively to disperse the mission people.*

Aunty Irene has evidence of who was responsible. As discussion progressed, she became more and more supportive of what I'm doing. She is critical of whites who profess to know all about Aboriginal culture after one or two visits. She will organise with Darcy for me to go out to the lake with Jimmy and Tom her husband. Gave recent evidence of Net-Net – small hand-prints on dish of scraps left out for dogs, small foot prints found outside in the wet grass.

Our talk, over a cuppa and cake, was a real 'ice breaker' and things improved a lot afterwards. I believe that Aunty recognised the need for that chat, a first step towards acceptance by and attachment to her family. She had been one of the LAECG panel members that I first presented my ideas to. And initially, Aunty had been quite sceptical of my Community involvement. So, the realisation she was now sharing information about family and Traditional Knowledge with me was very special, a strong indication of my growing acceptance. In a very real sense Aunty was reaching out to me and extending the hand of friendship, helping me to connect better with her Community. I drove away feeling absolutely elated.

One further, enduring powerful epiphany for me has been the personal and at times surprising experience negotiating my way through this autoethnography. It has been quite simply revelatory because for the first time in my life I have had my expressive boundaries extended way beyond the stylised, third-voiced and structured formal report writing style, totally bereft of emotion. Being able to enjoy the freedom of written expression has been exhilarating. Visualising and describing my field experiences working within the Community social fabric has been transformative and life changing, because it has enabled me to understand how my Community-based experiences have changed me for the better, and how I

have grown. Teasing out and weaving those strands of individual threads of evocation, voice, third space, contact zone and enabler/restrainers into the underlying social fabric to create a wonderful rich tapestry has been a monumental achievement at a personal level.

4.4 Negotiating the Initial Community Contact

4.4.1 The Preliminary Steps

This section explains to the reader the preliminary events prior to the first Community contacts. I feel it is prudent at this point to provide some context to the quite complex background processes involved in first initiating and then establishing the first contacts with each Community. I will endeavour to demonstrate that the choice of Community was not arbitrary, nor was the choice of the main Traditional Knowledge provider. In Chapter One I mentioned that my opening introduction to Aboriginal Australia was through my teaching position at the multi-cultural Darwin college in 1992. I feel that I should now disclose the series of unanticipated events that led to my choice of college, and then the subsequent choices of Community.

My original intention was to teach at an NT government secondary college during my family's yearlong stay in Darwin. For the first three weeks of the school year, I endured relief teaching at various government schools. During this time, however, I was contacted independently by a private secondary college offering a teaching contract for the year. My connection with the private school was through a family friend from back home in Victoria, who had previously lived in Darwin and knew, firstly, that I was going up to Darwin for the year and, secondly, that a private multi-cultural college in Darwin needed qualified maths-science teachers. I eventually accepted a position at that college, a decision that ultimately formed the basis for the original book-writing project and, subsequently, this current research study. I have previously mentioned that teaching the Aboriginal students in my year nine

science class generated the concept of a two-way science curriculum. Teaching this class was the first step, and the second was my arrival at the Top End Community where I met and discussed my ‘home group’ student’s end of term reports with their parents.

It is fitting that I remind the reader of the preceding Section 4.3, ‘An Epiphany’, because that was what this trip was. The Community and its wonderful Country was an absolute revelation, instantly generating a solution to that vexed question, just how was I going to integrate Western Earth Science within a traditional Aboriginal knowledge context? Almost instinctively I knew that the science content had to be immersed within the traditional cultural framework. It was all about presenting a unified picture of the local Australian landscape, but the Aboriginal worldview had to take precedence, logically because it arose there first, and had to be seen as such. So, every section of the book had to commence with the Aboriginal cultural perspective.

I reasoned that as far as possible the traditional Aboriginal cultural knowledge had to be drawn directly from the Community. Quite simply, I felt that it was extremely important for the eventual recipients, the students, to understand that the Traditional Knowledge they were learning about was provided directly for them by each of the respective Aboriginal Elders and Traditional Owners. The students needed to see that their science work was provided directly for them by the Elders and traditional Owners. In other words, the items of Traditional Knowledge were not cold artefacts drawn from a museum or other secondary source. Furthermore, the Traditional Knowledge was presented as a framework around which the Earth Science content was applied. The essential message behind the book was that it represented the Community, people and Country, and this in turn would mean travelling out to each Community, forming a sound working relationship with the Traditional Knowledge providers, and then collaborating with them to collect the knowledge as needed.

As previously said, the choice of the Top-End Community was indirectly determined by the private college I was then teaching at, and directly by it being my 'home group' students' Community. The college was residential; the students travelled to and from the college at the end of each school term. Hence, the choice of the first Community was not ad hoc but simply dictated by the internal administrative mechanisms within the college. My appointed home group was the luck of the draw, and possibly quite critically so. Any other Community might well not have had the same revelatory impact as the Top End one had. The choice of the second Community was linked to the church I attended, whose minister had in a previous role been a 'frontier chaplain' in Central Australia. He suggested the Community for me, and also nominated a local Aboriginal as contact person.

The third choice of Community, in the Australian southern coastal region, also arose through my local church involvement. On the advice of the minister, I contacted a senior Aboriginal woman, an 'Aunty' who was well known within the Southern Community. There was also another Aunty that I contacted, who once again had familial ties to the Southern mob. Through my chats with these two senior Elders, I started to form an understanding about family networks, their connections to Country and who were the key family members to contact. I then contacted the Victorian Aboriginal Education Association Incorporated [VAEAI] for further Community contact advice. Initially I was warned that I would find it hard going because the Aboriginal communities had become very guarded against Gubbahs coming into the Community to conduct research – too much injustice from the past. I did however follow their advice and organised a formal meeting with the Southern Communities' Local Aboriginal Education Consultative Group [LAECG].

4.4.2 The Initial Contact

My initial contact with each Community was facilitated through either a recognised and respected formal Aboriginal linked agency or an authorised representative. With the Top End Community, it was initially through my professional association with the college, following on through the research and development of the books. The reasoning behind my contact with the other two Communities was from the first instance, the Earth Science book I was developing. Very early in each case, the key Community participants were made aware of the intention behind the book and its mutual value for both black and white students. These initial Community contacts provided the Community with background knowledge about my intentions and aim. My initial contact in the Top End Community was through the local primary to secondary community school, where my official presence was as a teacher from the Darwin based secondary college.

My initial contact with the Centre Community was through the Community council administrator and his cultural adviser. The point I'm making here is that there was a clearly signalled intent behind my initial visit, which was then followed up by a series of prearranged visits used to further strengthen the community relationships, develop the social networking, and progress the fieldwork. There was never ever an ad hoc visit. Every Community visit was pre-arranged and approved either through the representative NT land council or directly with the Southern Aboriginal Co-operative. Both councils and the Co-operative, for the purposes of this study, shared similar governance duties and responsibilities for their respective Community and were the initial points of contact for the commencement of each field trip. A routine that was all part of doing things the proper way, being respectful and mindful of conforming to the local behavioural norms and mores forming part of the local cultural and social landscape.

On closing this section, the reader should be reminded that while the connection to the original book research and development project may be obvious, and circumstantial, it still often causes me to reflect on the set of circumstances behind the origins of the bookwork itself. I'm often drawn to look at it in terms of serendipity and providence. I should also point out to the reader that the following sections, 4.5 to 4.13, represent the series of findings derived from the research methods as described in Chapter Three, specifically sections 3.7 to 3.10.

4.5 Community Location as a Work Cell

4.5.1 Introduction

My analysis of the data uncovered possible connections between some social elements and variables within the Communities. I discovered possible connections between the way in which I talked to the participants, my team members, and where in the Community I spoke with them. So, a possible link between type of talk and place of talk materialised. There was also a certain spectrum of talking types identifiable with each Community location. Each location acted in effect as a work cell, each one fulfilling an essential role for me and my participants, where each cell was an integral part of the whole project. I have borrowed the term *work cell* from the business and commercial world, where it is seen as a logical and/or physical arrangement and denotes a specific task. The reader can imagine each Community location as a cell, defined by its location, containing specific participants each with a role to play. The Community can be visualised, in effect, as an overall field operation base, with each cell contributing as an integral component to the overall book project operations.

An important precursor to developing the narrative about interpersonal conversation types is to provide a situational context for the reader; setting the stage within the broader

social context for each community, a context related to Community social settings, their locations, and the matrix comprising the different social sub-groups that participant community members belonged to. The Aboriginal people that I engaged with in a variety of shared experiences were members of these sub-groups, all inter-connected as a collective social network, which formed a highly effective operational base for the book's fieldwork. I have labelled each sub-group by their location within the Community they were associated with.

4.5.2 The Work Cell Locations

In the following sections I will show how the social matrix of work cells was functionally unique to each Community. This is best illustrated by looking at the sets of locations where conversations were conducted. The reader needs to understand here, perhaps, that the specific Community locations in this research were entirely happenstance. They just happened to be where the majority of the verbal communications took place during the ten-year period.

The most complex set of locations was in the Top-End, where I engaged with 19 Aboriginal people who each played a significant role in one or more aspects of the original bookwork. I engaged with these 19 people in one or more of eight significant work cells, during the course of the project. I have labelled each of these locations with an identifiable descriptor: art-craft centre, council, club, home, linguist, other, school, and site visits. To further clarify, I have used 'various' as a collective term to refer to places such as the Community store, a variety of open-air locations around the community, and a hospital visit. The conversations at these locations were individually minimal but collectively significant. I have also decided to define the term 'site visits' to include the travel to and from as well as

being on site. The rationale for this decision was that much valuable conversation took place on the way there and back again.

The Centre Community, where I engaged with 16 Aboriginal people, had six locations: the council, home, other, linguist, school, and site visit. The collective term 'various' used here refers to 'outside in the open', and the 'art-craft centre'. Individually they represent minimal contact but are collectively significant. The 'site visits' also included the return trip to the site. The Southern Community, involving 16 Aboriginal people, each with a role in the original book project, had six locations as well, and these were the co-operative [more recently referred to as 'the corporation'], home, other, mish, school, and site visit. Once again, I have adopted the collective term 'various', which for this Community embraced several places: church, café, pub, sports event, funeral and hospital visit. The 'site visits' again include travel.

All three Communities share the home, school and site visit locations as common places of social engagement. The locational similarities between the two traditional Communities are also apparent, these being the 'council' and the 'linguist location'. The Southern Community's much longer history of engagement with white Australia has injected a unique cultural overlay, which in part reflects the significant places of engagement. The Southern Community's social matrix revealed two distinctive locations that identify with southern Australian Aboriginal Communities and their immediate past history, the co-op or co-operative (now corporation) and 'mish' or Mission.

When analysing the diary entries and field notes for talking types, I found the type of conversation I had with each participant was often linked to the location. I'm probably stating the obvious here, but the three Communities were very different to each other, certainly in terms of their local culture, language, landscape, climate, and by extension, to the

Community-based locations where most conversations were conducted. To provide a more sensitive, accurate and reflexive account, I have also included the one-on-one phone conversations in the total locational counts. My rationale for this relates to the importance, and absolute necessity, of the phone calls to developing and strengthening the necessary initial social networks, and in an ongoing role, for the preliminary preparations and arrangements required before arrival.

Many of these phone calls were directly related to preliminary arrangements critical to the success of each field trip, matters to do with such things as scheduling activities, briefing the key participants and generally facilitating the setting up of the internal and essential operational structures behind the fieldwork. Given the necessity for optimal time on task when in situ, the pre-field-trip arrangements were essential and integral to the overall bookwork. The phone calls, too, were in themselves an accurate reflection of the face-to-face conversations held within the communities.

4.6 The Community, its Social Networks and their Positioning

I discovered that I'm like everyone else in that I formed my own social networks within each community, composed of new friends, their families, and other people that I became acquainted with. In terms of the book project's work cells mentioned above, each was identified with its own social sub-network working on a specific task or with a defined role, and with varying degrees of interdependency. The Community can consequently be visualised as an overarching network of all. The reader should at this point equate the term 'social network' with 'support network' because without these people, my wonderful participants, the book project work would never have succeeded. The Community participants were generous of their time, expertise and sharing of Traditional Knowledge. If

there is one solitary finding that should come out of this current study, it is that a researcher cannot accomplish this type of work independent of the Community.

An interesting and consistent feature for each Community network was the bonding feature that distinguished my social network. This was the united goal of working in various ways towards the completion of the book project. This was the raison d'être understood by all. The group of people as a whole were not held together by any pre-established personal relationships, and the connections with each participant were built one at a time. These participants, wonderful people they all were, comprised different family groups. The specific roles each played varied from being a TO or Aboriginal Elder, who were the primary Traditional Knowledge providers, to other Community members who through their employment at the Community school, literacy centre, council or co-operative became my friends and provided me with support and guidance. Every member of my social networks gave me invaluable feedback on each draft for the book, hence the book was very much a collaborative and shared enterprise.

Each community had its own unique social network, composed of clusters or cells of participants, bound by filial and ceremonial ties. These clusters were often independent of each other, but I often saw movement of various participants from one to another due to social and workplace needs. These networks were arranged according to familial ties, ceremonial connections, and administrative or work commitments. I found that my place and level of attachment within each of these clusters developed progressively through a series of stages as my accumulated level of time spent in community grew and associated acceptance developed. These stages, when viewed reflexively, approximate to the recognised team development stages (Tuckman, 1965). Consequently, very early in the analysis I decided to

label these stages as *initiating*, *building* and *maintaining*. At times there were significant bursts of development and progress, often unanticipated, that I referred to as an *extension*.

I would argue that my four stages of Community team development: initiating, building, maintaining and extending, conform roughly to Tuckman's (1965) *forming*, *storming*, *norming* and *performing*. While the time required for reaching each stage varied, according to the multiple community factors at play, the actual sequencing of the developmental stages remained consistent for all three communities. For the two traditional communities, the visits were limited to periods of two to five days, which involved bursts of frenetic energy to get the job done in the time available. At various times this created tension and strained working with the key participants, who overall were very accepting and understanding of my situation.

4.6.1 Progression in Performance and Productivity of the Community Social Networks

I feel that it is important to provide some context and detail to the challenges faced when conducting the fieldwork while working on the book. Negotiating the social fabric around the fieldwork would often prove challenging, however negotiating the physical elements were another matter. Working within the time and financial constraints necessarily defined and sometimes constrained the goals and schedule achievable for each field trip. This always required a considerable effort with pre-field trip planning, but despite every effort to mitigate against unexpected happenings and holdups it was sometimes a case of, to paraphrase Burns, the best laid plans of mice and men going awry. I should say that while a lot of the interpersonal social interactions that took place in the communities were unpredictable and spontaneous, my fieldwork experience was much the richer for it. The Communities were a social dynamic, visually and viscerally, catalysed by numerous factors

to do with personal and family matters, many of which you would find in the broader Australian community.

The traditional Aboriginal Communities are more complex and dynamic due to their cultural fabric, with a combination of social, cultural and kinship-related conventions needing to be allowed for. Quite often, Community practices such as avoidance behaviours, and traditional observances such as 'Sorry Business' and Ceremonial commitments such as Secret Men's Business, had at times to be allowed for and worked around. And, then there were the weather patterns, which weren't always predictable, meaning that at the last minute on occasion, I had to rearrange transport from road travel to flying in and out.

In Chapter Four, Section 4.6, I have described how the Community social networks developed through a series of stages, and now building further on this, the analysis revealed evidence of signifiers that are indicative of those developmental stages. My notes hint that I was conscious at the time, but probably only marginally, of how these events were progressing and their overall importance to the sequence of outcomes and short-term goals. It is now apparent to me that I must have been adopting a consistent, reflexive practice because I routinely monitored the behaviour of Self and the Others, and how the Others reacted to me. There were moments when my observance of conventions lapsed, where I failed to read into social situations when unforeseen dynamic circumstances arose, moments that were often accompanied by emotion and anxiety, causing interpersonal communications to become strained, making conversations difficult.

Interpreting the extension events as such proved to be the most challenging because the decision to mark an event as an extension was often independent of the general social networking level. I judged an event to be an extension when the circumstances were extraordinary and well beyond the current level. An example of this was when I took Lenny

to Mt Liebig on my return to Alice Springs. Along the way, Lenny showed me a cultural site which provided an interesting and valuable addition to the bookwork. This was a wonderful surprise for me, totally unexpected and out of the ordinary.

All events are related to conversations and, for this section of the study, do include (non-face-to-face) phone conversations. Also, all other modes of communication, emails, faxes, and letters have not been included. Some days out in the Communities were extremely busy where it was not unusual for me to record more than five separate events with varying social interactions on a given day. And often the activities themselves involved significant mental, emotional, and physical demands. I would often have to take a nap during the afternoon when working in the Top End Community, especially after spending a strenuous day in the tropical weather after just arriving from a mid-winter Melbourne. During those years when I was still teaching full time, the fieldwork trips tended to be tiring and nerve wracking. Maintaining one set of activities separate and independent of the other, and requiring two completely different mindsets, was often quite a task.

4.6.2 The Network Stages and Their Signifiers

4.6.2.1 Introduction

It became apparent to me during the earliest phase of the analysis that my original fieldwork journey progressed through a series of development stages of my Community social networks that were absolutely critical to the success of the book project. I have termed these stages initiating, building, maintaining and extending. I was interested to discover during an early phase of the analysis that I was using very similar terms and descriptive phrasing to denote each particular network stage, for all three Communities. Consistency of phrasing for descriptors within a community was a significant marker, I suspect, for validity and reliability. I need to reassure the reader here that these networks were not clear at the

time, indeed I never had the time to ponder over them, but with hindsight and by adopting a reflexive overview it became clear that each of these groupings of participants that comprised the networks, were both identifiable and themselves uniquely composed. Each network group had its own special part to play in the overall book project.

There is no hard and fast rule that defines the timeline framing each stage of the network development, nor their precise start and end points. Indeed, within each work cell there would be a range of initial contact times for each of my participants. In general, my first contact with the majority of work cell members would roughly have been at the same time because they were members of the same family circle. But there were several cases where I was introduced to a new participant, after having already reached the 'maintaining' stage with all the others in that work cell. Cases like this were typically associated with recruiting a recommended Community member who had additional traditional skills and expertise to contribute to the book.

4.6.2.2 The Initiating Stage

This stage encompassed all of those activities, events and associated interpersonal engagements that occurred right at the start of the fieldwork. Much of this stage was necessarily conducted by phone and involved matters related to forward planning, arranging trips out to the Community, and sourcing advice on various administrative, cultural and logistical matters.

I begin with an entry from my diary:

Trip. Centre. Initial community visit. Realisation of scope/parameters.

Familiarisation of surroundings.

This typical extract of an entry from 6 October 1994 may be brief and cryptic, but it's one that is full of meaning and information. This was on the first trip to the Centre Community, and the experience was an 'eye opener'. Everything about this Community and its people was totally different to my previous collective experiences in life.

Analytic Memos: Some common examples of these short phrases that I typically used during the analysis to signify the 'initiation' stage were: 'initiating community visit'; 'reconnoitring community'; 'establishing intra-community connections'; 'meeting with CTO1 and linguist'; 'Initial meeting with senior TO, request support'.

To explain further, the networking stage signifier used here, 'meeting with CTO1 and linguist' would, at a later time, come to signify that a 'maintaining' stage for the networking had been reached. The temporal differences, though, between these two occasions would of course have been the unique behavioural overlays, such as the subtle but observable mannerisms, changes in body language, projection of personal confidence when working in the third space and negotiating the contact zone; the manner in which we interacted, and the certainty and confidence that I attached to the encounter. All a matter of accumulated time spent, and increased experience and confidence behind Self working with the Others within the Community.

4.6.2.3 The Building Stage

The building stage spanned the first few Community visits and was characterised by finding my way around each Community, getting to know who the participants were and where they lived, and how best to approach and engage with them. During the period of these early field trips, I was being coached by several mentors, Aboriginal and non-Aboriginal, all of whom were very experienced in Community life. They advised me on how to conduct myself and tackle the fieldwork in a way that was respectful to, and cognisant of, the cultural

mores and status of my participants. Being able to go about doing things in the proper way was paramount. These experts lived both in and out of the Community, and particularly for the two traditional Communities, their advice was invaluable. This building phase was also important for the Community members too. They had to learn how best to work with me because for many of the participants it was a first-time experience working with a 'white fella' outsider, especially to do with educational matters.

> *15 June 1992: Visit school – permit form from Jen Parker, took it to council where it was filled in no problems. Rex was very helpful, took us to Jack who was in a neck brace – he recounted a story of rock features around town, of two animals, one male and one female. They visited the escarpment area, the female had a broken leg, unable to climb the escarpment, putting large scratch marks in the rock face, fell down and her body forms the large rock at the base of falls. Also, Magpie Goose rock and Leech Dreaming Rock – a hole in rock is stuffed with grass to stop leeches from occurring. Spent some time trying to get Aunty Betty ready to talk with Jack in their local language, but she was unwell. Later in the afternoon, she was able to assist, but Jack himself was not well. Travelled up to the spring area, water supply site for town, very long and rough road, good swim holes, some good cross bedding, and one small area of ripple patterns. Visited the [cultural] rock, took photos of art gallery and town environs. Made possible arrangement for tomorrow, for Aunty and Jack to tell story in local tongue. Hopefully, Danny takes us to sites to photograph the Dreaming sites.*

These notes are typical for the early Community visits, in this case the second. I had previously met all these people, all of whom would become key contributors. I was still finding my way around the Community, connecting my participants to their future roles in the project, whether Traditional Owners such as Jack or Aunty who were to be the traditional information providers, or non-Traditional Owners like Rex, a man of fairly high community status and ceremonially connected to the Traditional Owner group. Rex would become a valuable source for reviewing the iterations of the bookwork, and also giving me feedback on how I was progressing, and sometimes quite critically so!

Analytic Memos: Some common examples of these short phrases that are representative of the 'building' stage were: 'Literacy Centre, Initial meeting with assistant linguist, request support'; 'Multifaceted day, interviews, informative post interview comments'; 'building Community network, sourcing advice and contacts on art'; 'building Community support network, talking with key Community members. Bonding – Community facilitator, TO family. Disclosure of challenging dynamics'; 'Building Community network, home visit, Meeting, Positive response'.

4.6.2.4 The Maintaining Stage

The main characteristic for the 'maintaining' stage was basically a feeling of smooth running, where the fieldwork operations generally ran as anticipated. I was achieving an optimal level of progress where satisfactory results were being attained for minimal effort, and I had reached a point where there was a greater certainty about the intended outcomes for each field trip. This stage was also associated with me being able to work more independently in each Community, such as visiting the cultural sites unaccompanied. I had by this stage become well known in the communities and was welcomed, attached and accepted by the people who were aware of the purpose of my visits. Their initial shyness, curiosity, caution,

guardedness and hesitancy were replaced by open trust and friendship, and a strong sense of connection. My status and standing had been elevated to that of an extended family member.

The diaries and field notebooks reflect this stage, with two typical extracts as follows:

6 June 1997: Top End Field Notes: Spoke to Jack, and Rex briefly at the club – will see them tomorrow at 9am – will go over the draft sheets with them.

August 1997: Picked up Uncle T. from Mish,[5] drove to albatross colony, checked area for flint tools, 1200–1315 in Park's office, dropped Uncle T. back at Mission then to co-op 1500–1700.

These brief notes are reflective of a 'maintained' social networking, and allude to a smooth routine, one step after another. My predilection for recording times was reflective in part of my past military service. I found timings to be useful for future visit preparations and scheduling the fieldwork. The Southern Community work, in particular, encompassed a lot more road travelling time, as the associated Country was significantly more diverse and spread out than for the two corresponding Communities up north.

Analytic Memos: Some common examples of the short phrases and expressions that I typically used during the analysis to signify the 'maintaining' stage were: 'Home visit, key facilitator/liaison person, cultural content development'; 'Collaborative talking'; 'arranging for meeting'; 'Phoned key liaison–facilitator, update/progress report'; 'Home visit with TO and wife, social/family talk, bonding'; 'Site visit, guided, non-TO and family, social/family

[5] The 'mish' is the local abbreviated term used for the old Mission site.

talk'; 'Visit Art Craft facility, meeting with senior artist working'; 'Impromptu social engagement, social obligation expectation'.

The above examples provide a variety of analytic memos drawn from all three Communities. These reflect the status of both the bookwork and family networking as the norm. They reveal my extended family status in the Community and the normal routines generally associated with the smooth operation of the book research.

4.6.2.5 The Extending Stage

Instances of extended networking tended to occur more frequently towards the end of the ten-year period, but they were not sequential, and often unanticipated. There were occurrences of this stage throughout the ten-year fieldwork program. In many cases, an extended event was also a key moment, a time when something out of the ordinary occurred, often unpredicted, and which had a significant impact on the bookwork, either materially or in a temporal sense. These extended events were often, in terms of contribution to the book's development, well beyond the norm, standing out in relation to that generally derived during the 'maintaining' level of networking. And often these events were accompanied by open expressions of enthusiasm, positive expressions of approval, and reaffirmation of support, co-operation and collaboration between Self and the Others. All indicative of strong levels of bonding and sharing, working together towards a common goal.

The two extracts below are examples that are indicative of the 'extended' network performance – actually, serendipitous situations that occurred occasionally in all three Communities:

> *7 June 1997: Top-End – 0915–1015: "Met with Jack, Rex, Dan and two others, went thru and discussed the prelim drafts. Much animated*

discussion, a lot of interest and general opinion was very positive. Jack mentioned two extra cultural aspects that could be included, so we drove out to perch rock and Long Tom rock. Elders, especially Ron, were surprised about depth of culture at the Centre Community especially that they were bush people so recently. They said that some of their recently passed away relatives had the holes through their nose. They were particularly taken by the 'Old Man Dreaming'.

11 October 1997: Attended the club from 6pm until 7.30pm. Spoke to Andy, James and Jason. Asked Jason about his skin group – Nabangardi, same as old uncle. Spent some time talking to old Max, Valerie and Marie. Valerie is putting me into my family context. I am 'Nakurrng' to Marie – cousin. That makes Andy my cousin.

Both extracts are parts of the full entry for that day. The first extract provides details of the feedback session, prearranged at the club the previous evening. This was the first formal occasion where I'd showcased the bookwork to a wider audience from the Community. I described this event as serendipitous because it resulted in two unexpected positive outcomes. One of these was the unanimous endorsement of the principle of teaching secondary students about the culture from another Country. So, this was not just the bridging of white and black cultures, but of different Aboriginal cultures. The second unexpected gain was the sharing of new Traditional Knowledge which augmented the bookwork beautifully.

An epiphany

What transpired at the social club, as described in the second extract was, for me, startling and transformative. It was profound, a very different event both conceptually and emotionally. I had, after four years of regular visits, been allotted my place in their family. At

the time, it was a very special occasion for me. I knew Andy very well by this stage as he worked in the literacy centre. He made a big contribution to the lengthy translation and transcription process for Aunty Penny's Djang[6] narrative.

Analytic Memos: Some common examples of analytic memos typically used during the analysis to signify the 'extending' stage were: Positive reaction from support group'; Sharing new Traditional Knowledge; Disclosure of ill health, uncertain future; Given family context; Good reaction to other Community's cultural content; Extraneous event, contingency, assisted ferrying Community members; display of Kormilda Science Project drafts, positive consensus; Advice from facilitator–liaison re conflict resolution; Extension Community social engagement; and cultural content development.

While these analytic memos may not be all that revealing, they do reflect situations that were outside the 'box', and sometimes quite pivotal to the future of the original book research. Sometimes, a crisis would arise within the Community, associated with such things as interpersonal conflicts or serious ill heath, which had the potential to stall or even end the work. But the majority of situations that accompanied an 'extending' network event were fortunately significantly more positive, not just towards development of a new strand of traditional content but also where my status and standing in the community was markedly elevated. The essential message here for the reader is that the bookwork was not just about developing the cultural content but also about my personal listening and learning, strengthening and building my standing and acceptance in the Community. The progressive bookwork and family connections were intimately blended together. One was as important as the other.

[6] Djang is the local term used for a Dreaming account.

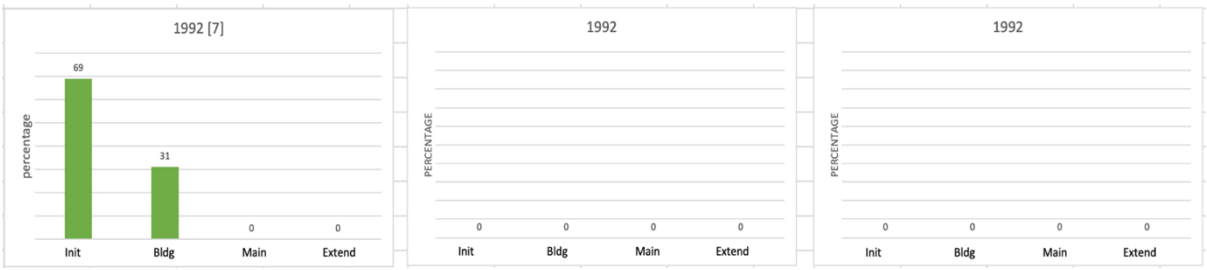
4.6.2.6 Safeguarding Privacy

I should point out that the above entries have been edited to protect as far as possible the privacy of each individual and retain anonymity for the Aboriginal Country. I've done this in three ways: by using pseudonyms for each participant; by using generalised descriptors for all sites of significance rather than their traditional, cultural name; and by adopting a broad geographical descriptor to denote each Community.

4.6.3 Progression of the Social Network Performances

Figures 4.1 to 4.11 reveal the levels of performance for the operational cells in the three Communities during the years 1992 to 2002 inclusive. In general, the graphs reflect the steadily improving interpersonal relationships between Self and the Others formed within the Communities; relationships associated with the strengthening of trust and friendship, improved levels of awareness and understanding of the intentions behind the fieldwork.

Figure 4.1 1992 – Pre-project Levels of Performance Attained, Top-End Community

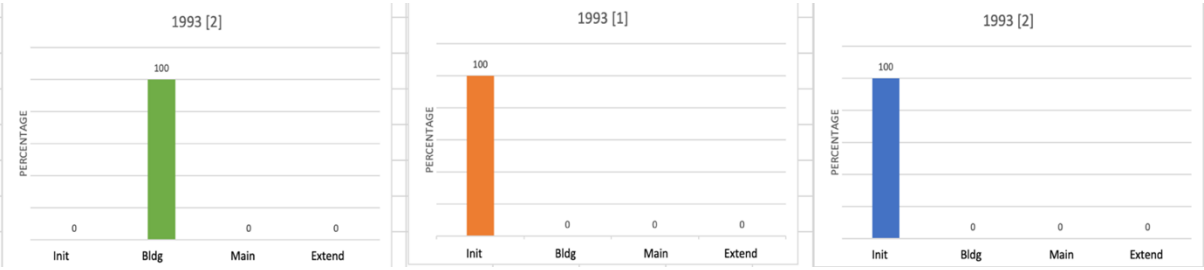


KEY: [1] 1992[7] – year [number of talks]; [2] Init – initial, Bldg. – building, Main – maintaining, Extend – extending.

In 1992, I visited the Top-End Community on two occasions as part of my Darwin teaching role. The primary reason was to present and communicate to the parents their children's' subject reports from the previous school term. My role was the home-group teacher, and the Top-End community had been allocated to me at the start of the school year. While some parents were sufficiently literate to read the performance reports for themselves, most required some help. Anyway, it was nice to meet the mums and dads and to put a human

face to the residential college their children were attending. Contact with the key participants was initiated during the second visit. We held preliminary discussions, working towards a mutual understanding and adoption of an enduring philosophical stance that formed the beginnings of the overall guiding concepts. Matters such as the guiding principles for the book's development, issues to do with the primacy of Traditional Knowledge content, adoption of a book layout that mirrored the connection between Community, the Traditional Knowledge content and the structural, cultural overlay. Having taught a small group of the Community's youth during 1992 was an advantage in establishing Self among the Community's Others.

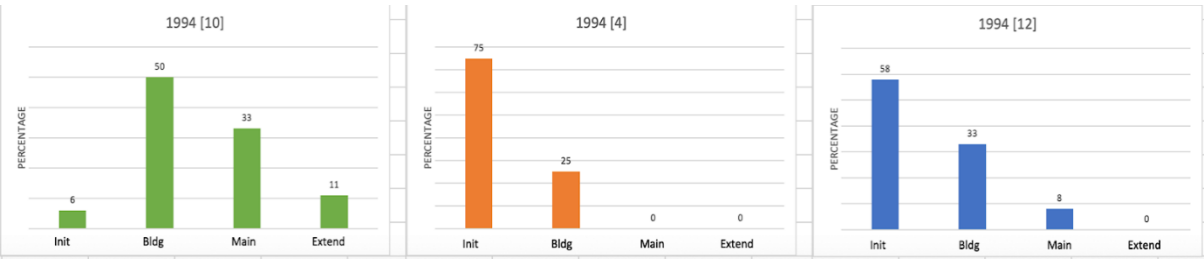
Figure 4.2 1993 – The Formative, Planning Year, Community Contact Limited to Phone Calls



Nineteen ninety-three was the 'calm before the storm' year, with no Community field trips. In an effort to anticipate what lay ahead, I used the year to lay the necessary groundwork, collecting my thoughts, and trying to conceptualise and rationalise the path ahead. To adequately comply with the Victorian Curriculum guidelines for the earth sciences and additionally demonstrate the diversity of Aboriginal Australia, I decided that a further two Communities would be needed. The actual choice for these two additional Communities was partly guided by advice from personal friends of mine, and partly by the need to obtain the right balance of geological and geomorphological mix for the book's content. Acting on their advice, I made a series of phone calls to Aboriginal and non-Aboriginal Community members as a preliminary step. Ascertaining what was required, chasing up appropriate

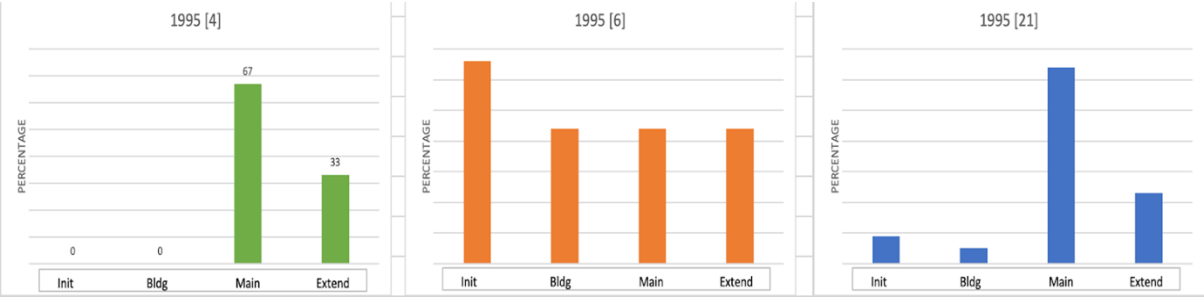
further contacts for the Communities and conceptualising just how to proceed was an enormously challenging task. The only social network development this year was limited to building a closer working relation with the Top End's linguist. I was under no illusions, though; I knew I was about to step out into the unknown. It would be a case of learning as you go.

Figure 4.3 1994 – The First Year of the Project Fieldwork, with Significant Progress Made



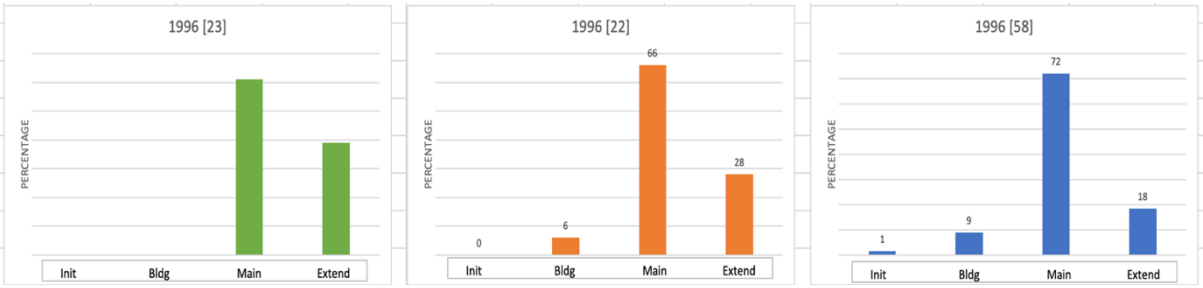
Nineteen ninety-four saw a significant increase in the fieldwork, with initial work commencing in both the Centre and Southern Communities. The Top-End Community was significantly further ahead in the social network development, indicative of the earlier fieldwork conducted in 1992. This year saw a spread of social network development levels that already included working at an extension level, indicative of the progress towards achieving an excellent working rapport between Self and the Others. The Centre Community made quick ground in establishing the necessary levels of awareness and understanding once the right traditional owner had been identified. His preparedness and eagerness to engage with the work was compelling and very heartening. The equivalent rate of progress in the Southern Community was comparatively slower, indicative of the need to establish trust and understanding of the scope of the work and its significance for the Community. Added to these hurdles was the difficulty in identifying the right Traditional Knowledge holders and winning their trust and commitment.

Figure 4.4 1995 – The Fieldwork Settled into a Reasonably Uniform, Predictable Pattern



The overall progress in 1995 was marked by a consistent trend in all three Communities: the emergence of social networks operating at an extension level. The higher frequencies shown for both traditional Communities indicate the easier, and less complicated path towards achieving the fieldwork goals. Gaining the necessary trust, co-operation and collaboration was much simpler. This was due in no small part to the well-defined traditional ownership structure in both traditional Communities. Nevertheless, by comparison with the previous year, progress within the Southern Community had also moved into the higher levels of cooperation. Interestingly, the small initiation and building stage components indicated the need to continue to explore for further dimensions of the cultural content and identifying new participants that would support the work.

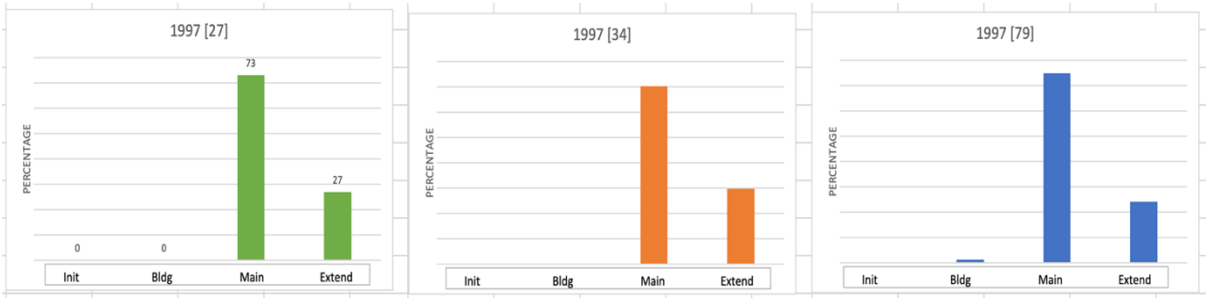
Figure 4.5 1996 – Plateaus in Performance Momentum in all Three Communities



The optimal ‘maintaining’ stage reached a significant level in all three Communities, with working relations with the non-Aboriginal social groups significantly higher than for the Aboriginal groups, reflecting the higher need for technical support in the linguistic and

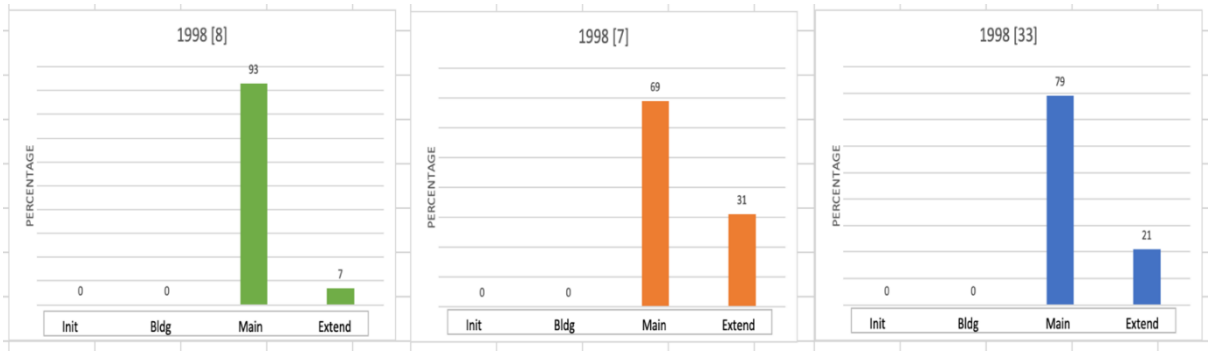
scientific content areas. The Southern Community also demonstrated a stronger contribution at the maintenance level that was indicative of a greater level of self-reliance and independence for the Aboriginal Community, and a much smaller proportionate level of technical support required from the non-Aboriginal sector.

Figure 4.6 1997 – The Peak Year in Terms of Time on Task and Bookwork Covered



The two traditional communities continued with significant amounts of fieldwork at both the maintaining and extending levels. Likewise for the Southern Community, but a small amount of fieldwork remained at the beginning level. The proportion of non-Aboriginal participation remained at higher levels for the two traditional Communities.

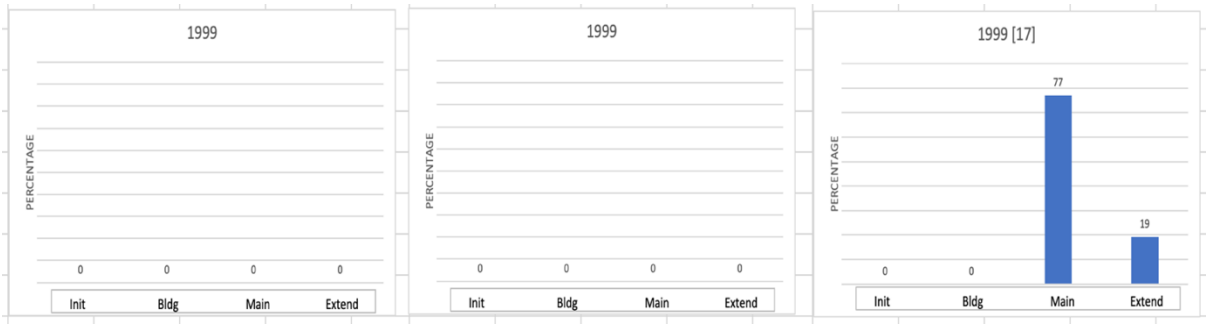
Figure 4.7 1998 – A Productive Year with Elevated Levels of Face-to-face Project Time



All three Communities continued at the maintaining and extending levels, with the bulk maintaining progress. The two traditional Communities showed a relatively higher involvement with the non-Aboriginal participants. The Southern Community demonstrated a

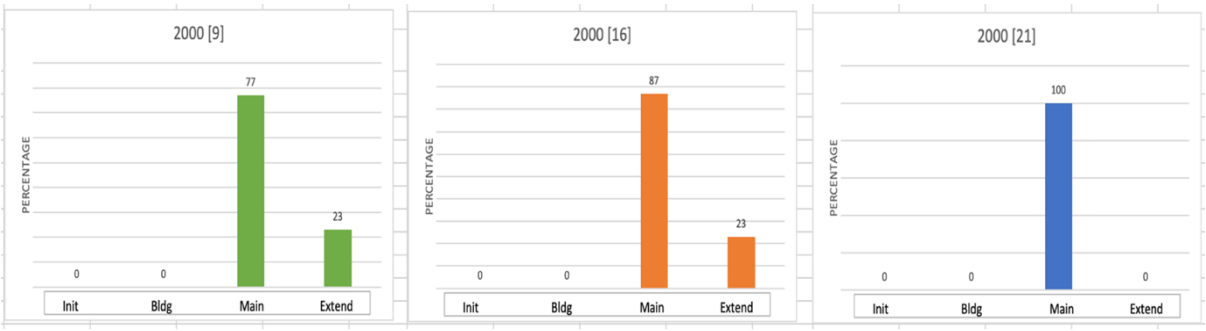
higher level of extension level work. A significant amount of time was spent working on completing the drafts, away from the Community. The emphasis was placed on Community reviews of the drafts and gaining feedback from the key participants.

Figure 4.8 1999 – Work Time Restrictions Restricted Fieldwork to the Southern Community



1999 proved to be a very challenging year with my full-time teaching duties taking precedence over the onerous fieldwork demands associated with interstate travel to the two traditional Communities. The fieldwork did continue during the year in the Southern Community but was necessarily restricted to the weekends and end of school term vacations. The work continued with a balance of both maintaining and extending levels of networking performance.

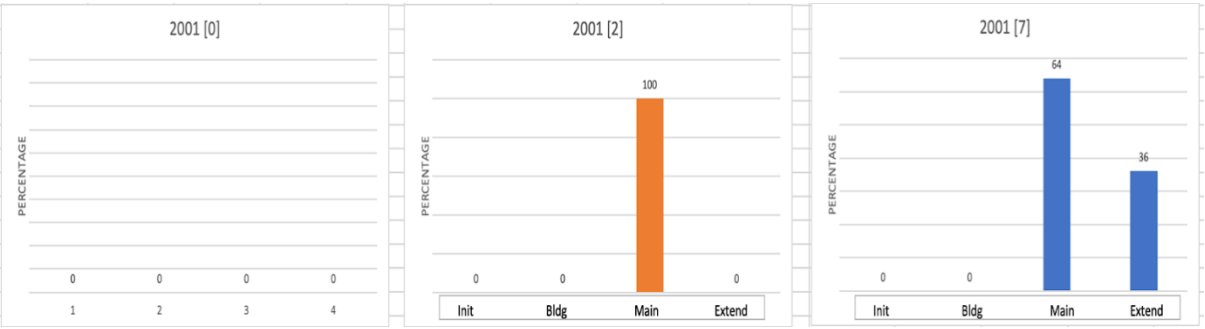
Figure 4.9 2000 – Maintaining Overall Progress and Finalisation of the Top-End Drafts



By 2000 there were no longer ‘initial’ or ‘beginning’ levels of performance within the social networks. All participants had progressed to at least the ‘maintaining’ level, with most

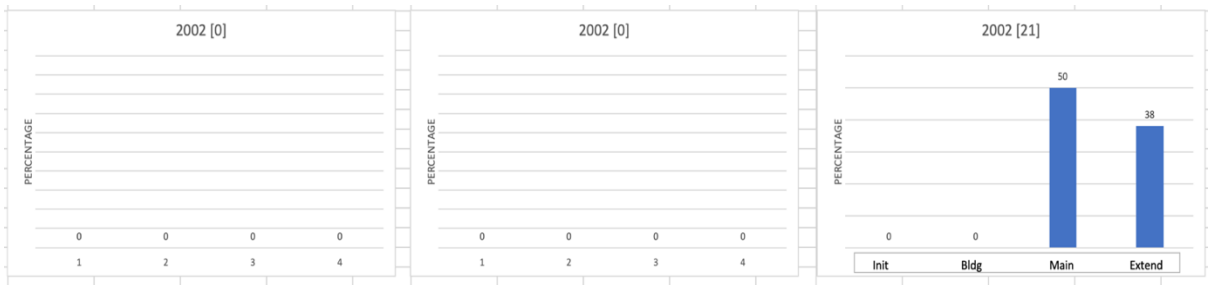
of the work at the ‘maintaining’ level of performance. There was significant performance at the ‘extension’ level with the participants, where new ideas and innovative content were developed. The necessary fieldwork was completed for the Top-End Community by the year’s end, essentially because my earlier start in the Top End enabled much quicker progress in the early 1994 and 1995 stages of the project.

Figure 4.10 2001 – Completion of Final Stages of the Centre Work, and Continuation of Southern



The year 2001 saw the development continued in the Centre and Southern Communities, with significant work at the maintaining level. The Southern Community was the exception though, with new content development through continuing extension level work.

Figure 4.11 2002 Saw Completion of Fieldwork in the Southern Community



By 2002, work in the two traditional Communities had been completed. The core content for each Community had been recorded, and their embedded Earth Science curriculum provided adequate coverage for the state’s science curriculum guidelines. The

inherent challenges associated with logistics management, including travel and accommodation costs, contributed to the 'take no longer than necessary' policy. While the relative ease of accessing the Southern Community did contribute to the decision to continue the bookwork, the main reason was the underlying complexity and breadth of the content being unravelled, researched and developed. Essentially, the main difference was that the Southern Community lacked a well-defined Traditional Owner and Dreaming account to serve as the central theme around which the rest of the curriculum content could be built.

4.7 The Different Community Talk Types

My analysis of the data uncovered what seemed to be a range of different talking types, where each talking type had certain characteristics reflecting the situational context and conveying intentions to express a certain idea or emotion. It was uncommon for a conversation to be composed of a single component talk type. Often, there seemed to be a unique composition for a specific location. I perhaps need to explain things a bit more here, for the sake of the reader, that there were essentially three key foci for the analysis of each diary entry for the talking types. And these were the location and context, the participant being conversed with, and the entry's content description of the exchange. Indeed, each participant became identifiable with a particular talk type, such as project driven conversations or family-oriented chatting. I would only ever meet up with some participants at the one location, such as the club or the co-operative, and these locations provided a certain context that guided my analysis. Also, while there is no particular order to these individual talk components, I have decided to follow the natural sequencing that seemed to happen when looking back on many of these conversations.

When I started analysing for talk types I began almost intuitively to unpack the first set of outcomes and noticed more specific themes that ran consistently through the data:

‘Conversations that are social’, ‘Conversations that are about the Project work’, ‘Conversations that are about Family’, ‘Conversations that are Revealing’, ‘Conversations that are Cross-cultural’, and ‘Conversations that are Collegial in nature’. At every engagement our conversation commenced with some degree of social talk, to the extent that it was essentially a given. These social chats ranged from a very brief cursory acknowledgement to longer conversations of just social banter about nothing in particular – basically just enjoying each other’s company. The sequencing of components was not completely arbitrary and did reflect identifiable patterns such as the connect between social talk count and the overall number of talks. They were identical in frequency. It was exceedingly rare for a conversation – any conversation in fact – not to commence with some element of social talk, no matter how brief, and interestingly, but outside the scope of this study, it applied to the non-Aboriginal participants as well.

What followed next in the overall conversation was quite often the main focus, a collaborative-type conversation, where I might have arranged with the Other a particular aspect of the Book Project, as for example, visiting a cultural site the next day. These collaborative type talks were always with those participants who were to play some role identifiable with actual content development for the book. This helps to explain why the majority of locations in the Community indicated a high level of collaborative conversations as after all, the main thrust of each field trip was to work on the book. The two locations with markedly lower collaborative components, the club and ‘various’, were generally places where relaxation and casual talking was the norm.

The Family type talks were again clearly of higher incidence, occurring more in the social club, the home, and at ‘various’ places where I and my participants were more relaxed and had the time to talk about family-related stuff. The results do, though, indicate that family

talk occurred at every location, often when a family member was either directly referred to, where some cultural aspect to do with ceremonial practice was mentioned, or when family connections to country would enter the conversation. So, talking Family was a common theme to my conversations with the participants, a theme that I would often observe in conversations between participants as well.

The conversations with a Project research component were less common overall, and were mainly restricted to the central information providers, the Traditional Owner group or senior Elders. These talks would occur when I would routinely ask various participants for their feedback on the developing draft iterations. These 'research' participants in the main were the better educated, with higher English reading and comprehension skills. I was fortunate in that four of these people were trained teachers, but not necessarily still teaching. The ability for me to have the bookwork reviewed within the Community and receive feedback as an ongoing process was invaluable to its development and intimately and inextricably linked to the book's accuracy, authenticity and connectedness to Community and Country. After all, the book was to be a representation of their Community and Country, and the faithfulness of this was best determined and managed by the participants themselves. Understandably, the highest incidence of research type talks was during the site visits, with the art-craft centre and school close behind.

Another talking type I encountered was of what I describe as 'Revealing' in nature. These components of a conversation were typified by the revealing of personal issues by the participant I was speaking to. In every case this conversation was spontaneous, with no forewarning. In many cases with the Revealing talks, the participant was clearly getting something of their chest. They were sharing a concern with me. Generally, I would remain a steadfast, active listener, refraining from offering an opinion. In one instance when I did offer

my point of view, essentially stating my neutrality on the issue, I was met with instant disdain and criticism. Point learnt. Often, these Revealing talks were delivered with a significant emotive content. As with the Family-type talks, the incidence of Revealing talks appeared to commence about two years into the bookwork's Community visits. It may have been a case of where my community acceptance, and perceived trust, had reached a critical level.

Often, these personal disclosures were couched within family type conversations, and at the time made me feel that I was being trusted and treated as an extended family member. The Revealing talks were less frequent and occurred more at the club, home, and school. Interestingly, the majority of these Revealing talks occurred in outdoor settings, when a Community member would see me outside somewhere in the Community and would approach me with some pressing concern which they wanted to share, such as the death of a relative or disclosure of some serious health matter. So, I was being informed because they knew that I was a friend and that it may also impact on my work for that trip. These talks tended to embrace issues of a negative nature, matters that were causing real concern and worry and at times I felt that by acting as a sounding board I was somehow ameliorating their concerns. When the talk had a positive context, I would reply by sharing in their enthusiasm and delight, expressing emotion. In rare cases, I would express my opinion where I felt that I could contribute some useful advice.

The next talk type, with a more general distribution, is associated with my conversations with the participants in the two traditionally based Communities. I refer to these as a bridging [Cross-cultural] type of talk, basically because, for these Aboriginal people I met with, English was not their preferred spoken language and for many, English was not their second or their third – or even fourth – language. In this sense, they were conversing with me in a cross-cultural capacity, bridging from their preferred worldview to

mine and to a lesser extent I was reciprocating when ‘white fella’ concepts such as payment for services rendered needed to be negotiated at certain times. Consequently, the flow of conversation with them was somewhat stilted sometimes, and the exchange of ideas and discussions about more Westernised concepts was sometimes necessarily limited. It certainly was not assisted by my lack of experience communicating with every one of them, but the baseline requirements were always achieved – sometimes with a bit of initial confusion, but misunderstandings were always worked through. Importantly, the Community members were extremely tolerant and understanding, and very giving.

4.8 Theme – Signifiers of the Talk Types

Section 4.8 builds upon the general theme of *talk types* and locations introduced in the previous section by extending the theme through incorporating descriptors or signifiers. Aside from the locational context aspect mentioned previously, the analysis of the diary entries and field notes uncovered common words and expressions that appeared to serve as signifiers or indicators for the different types of talk when engaging with the participants.

4.8.1 Community Conversations have Specific Components

My analysis in the pursuit for themes involved unpacking the data body into various strands, all inextricably tied to my face-to-face verbal communications with each of the participant Community members. I have chosen to define conversation as a face-to-face, verbal exchange, an interaction between Self and the Other. To clarify matters for this study, I have decided to incorporate dialogue as a subset of conversation, because it implies a discussion or negotiation so that all parties can reach an understanding. I have also chosen to regard each conversation as compromising an amalgam of various types of talking, which I have previously referred to as ‘Social’, ‘Collaborative’, ‘Family’, ‘Project’, ‘Cross-cultural’, and ‘Revealing’, in no particular order.

My coding analysis of the categories and emergent themes indicated seven different forms of conversation. Additional to the six referred to in Chapter Three (Social, Collaborative, Family, Project, Revealing, and Cross-cultural), a distinctly new form of talking also emerged. The analysis also indicated a propensity for a particular form of conversation to occur at a specific location in the community. I analysed and conceptually unpacked the conversation themes into categories that link into the research question and sub-questions, which in terms of outcomes can be broadly grouped and described as 'Community conversations have components with a specific form', 'Community location is usually associated with a predominant conversational component', 'Participants' roles reflects their conversational component spectrum', 'A Community displayed a unique conversational range' and 'Conversations linked to "uplifter" and "downer" events were part of the "book" project journey'.

4.8.2 Conversations with a Social Talk Component

Social conversation is defined as talking about someone who isn't present (gossiping), catching up, particularly after a lengthy absence, talking to someone to find out what they have been doing, informally about non-important matters. The Southern Community mob also refer to 'Talkin' silly' where you are conversing using informal language that is more casual, spontaneous and has a tendency to provoke a reaction. It may also at times be simply interacting with each other, and not much else, where you look at your watch just as much as you talk to the other person. But when the conversation became animated, and a sense of emotion or feelings arose, and you and the Other feel a sense of hope for more, then it becomes an engaging talk. Often, depending on the situational context, Family or Collaborative talking would then follow on.

I also quickly learnt that the nature of social talk was a strong indicator of how receptive the Other was, occasionally signalling that another time would be better. Sometimes, and usually unbeknown to me, key participants were heavily involved with their own domestic and community issues, and it was impossible to engage with them. On occasion, they would later apologise, and usually another opportunity to catch up with them again presented itself during the visit. Interestingly, I had my mutual friends, the gossipers, who would sometimes explain why it happened, providing the underlying issues.

In general, I found that most conversations, particularly after a prolonged absence, started with a short chat with local gossip, news and a general catching up, with the length of the social talk roughly proportional to my absence. Catching up on Community news soon after arrival was more important in the traditional Communities because any deaths that had occurred since my last visit invoked traditional avoidance behaviours preventing the deceased's name, or names similar to it, from being said. So, any other Community member with the same name or one that sounded like it, had to take on another name for the next two years. When I was sitting down or standing around with groups in all three Communities there was always some social chit-chat or banter about trivial stuff, and I found that this would often ease Self and the Other into further conversation. There wasn't necessarily engagement or eye contact with the person you were talking to, but the preliminary social chat was a lead-in to the next phase of the conversation, if there was one.

Some Community locations had higher social conversation loadings than others. The social club was obviously one of these. So was the co-op in the Southern Community, but more so after work when staff would sit around chatting. Home visits were also accompanied by a higher percentage of social conversation, consistent across all three Communities. Another consistent socially dominant conversational setting was during the return drives from

the cultural sites. The Traditional Owner (TO) or Aboriginal Elder was more relaxed than on the outgoing trip and no longer focused on the job of delivering the Traditional Knowledge. I would often sense that on the drive out they were keying themselves up, preparing for their eminent delivery when on site, complete with emotional trappings and all. Another setting with consistently higher social conversation loading were those places I've previously described as 'various'. These places included just being outside in the open, or attending church, cafés, funerals and sporting events. The 'various' places occurred far more often in the Southern Community where mobility by car was more common. In the two traditional Communities the residential area was much smaller, and movement was often on foot. I would often find that these social encounters revealed little snippets of additional family and personal information, with each snippet providing an additional veritable jig-saw piece to that family's identity.

4.8.3 Conversations with a Collaborative Component

The original Community-based book project work was both collaborative and co-operative in nature. From the very start of what turned out to be a lengthy enterprise, the manner in which I worked, with and within the Community, was inherent in the success of the books. The mutual understanding between Self and the Others was that the books were a joint Community effort. I was, for the purposes of the book, a member of the Community, and an extended family member. Whenever one of the participants contributed to the book, no matter what role they played, they understood they were contributing to the eventual successful outcome: its publication. The Community retains ownership of the Traditional Knowledge, and all royalties from the sales go back to the community. Hence, it is quite appropriate to refer to the conversations that related to elements of organising for and carrying out subsequent phases of the fieldwork as 'collaborative discussions'.

The frequency for collaborative talks was consistently high for the Top End, Centre and Southern Communities, being 73%, 71% and 84% respectively, roughly three quarters of all the conversations. This reflected the primary focus behind my Community field trips as understandably there was a strong focus on the bookwork and the need for getting the job done. The frequency of research type talks was 32%, 40% and 17% respectively. The disparity here reflects the differences between Communities in terms of the number of participants who were directly involved in the delivery and development of the Traditional Knowledge content. For the Top-End Community, 14 participants out of a total of 19 were involved, four of these being either the Traditional Owners themselves, or close family members with special cultural rights. The other 11 participants gave me additional Traditional Knowledge that allowed for a more comprehensive interpretation of the cultural perspective for their Country.

I was soon to learn the protocols and conventions to be observed during this process, because in the Top End the non-Traditional Owner group could provide knowledge that was associated with but not directly linked to the core Djang. The Centre Community had a lower number, with eight participants who were directly involved, out of the total 16 people. Two of the eight were Traditional Owners, who provided the indisputable primary-sourced cultural data for the Tjukurrpa, while the other six provided supplementary Traditional Knowledge that, while separate to what the Traditional Owner provided, added rich cultural overlays. The research and development of the traditional cultural knowledge content for the two traditional Communities required a far more rigorous and extensive effort due to the book presenting the local Djang and Tjukurrpa narrative in both the local language and English. This necessarily involved a protracted recording, transcription and translation phase, spanning a two-year period in both Communities. It was felt that aside from being a valuable pedagogical tool for bridging the cultural divide, by providing the respective local Djang and Tjukurrpa accounts

in both languages it would deliver the students a deeper, more valid, connection to the primary source providers, the Traditional Owners.

Table 4.1 Participant by Location of Face-to-Face Contact

Community		Top-End			Centre		Southern				
Participant		Jack	Rex	Hetty	Bobby	Lenny	Darcy	Lilly	Tom	Lisa	Mick
Place of Face-to-Face Contact	Home	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Club/Pub	✓	✓						✓		✓
	Co-op / Council		✓		✓	✓	✓	✓	✓	✓	✓
	School			✓		✓	✓				✓
	Various	✓	✓		✓	✓	✓	✓	✓	✓	
	Site	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 4.1 provides a simple overview of the variety of locations where I engaged in face-to-face conversation with the individual Aboriginal participants. It will be seen that location determined what types of conversation were engaged in.

In the Southern Community there were four Traditional Knowledge providers, two senior men and one senior woman, who were the acknowledged Traditional Knowledge custodians and the facilitator–liaison person. This much lower number reflects the sad loss of Traditional Knowledge and culture experienced by all southern Aboriginal Communities in Australia, and more pertinently, which Community members have the knowledge and are prepared to share it. This created the vexed aspect of diffuse ownership and proved to be the greatest and starkest difference between the southern community to the other two. A case of who knew what and who was prepared to share it.

4.8.4 Signifiers of the Collaborative Talking Type

I found a consistent pattern arising from the analysis of the data where keywords consistently correlated with collaborative actions. Key among these was the word ‘arranging’, which occurred a total of 234 times in the diary entries. The Community breakdown was 163 (Top End), 63 (Centre) and 362 (Southern). These numbers correlate

roughly with the number of community visit days, but also include phone conversations. As I have explained previously these phone conversations were an integral and necessary component of the bookwork. But I need to note some caution here, because many of the entries that I have analysed for talk types are impossible to restrict to a single type. In many cases where the intent and main thrust was collaborative in nature, there was an obvious implied 'research' underlay as well. In these cases, the 'collaborating' and 'researching' interplay cannot be separated.

A deeper analysis of 'collaborative'-type talks revealed the following gerund signifiers: updating (where I would sit down with the participant(s) and run through the latest iteration of the drafts), reviewing and receiving feedback (sometimes followed on from the updating, but more focused on attending to accuracy and sensitivity issues with the content), accessing local knowledge (generally referring to gaining cultural, or Traditional Knowledge from the Traditional Owners or Aboriginal Elders), meeting (which always indicated a get-together aimed expressly at developing an aspect of the bookwork), interviewing (a meeting that specifically involved a semi-structured or open-ended interview), giving help (this occurred occasionally where I was asked by the Community to assist with some contingency) and asking for help (on occasion I would find it necessary to seek help with a particular problem).

In the main, my collaborating participants were, of necessity, the Traditional Owners and Aboriginal Elders, basically because they were the primary Traditional Knowledge holders. But there was also a second, outer layer of participants, my ancillary team members, who played important collaborative roles; who, through their opinions and advice, provided me further guidance in negotiating the maze of cultural mores and protocols, for keeping me on the right track, and doing things the proper way. I should perhaps point out here that while

all these signifiers identify my collaboration with the individual participants, there were also strong elements that indicated high levels of co-operation. The bookwork was in every way a joint co-production. And I will indicate further along in this study that these collaborative talks were very much a part of my listening and learning, my inescapable cultural awareness training.

4.8.5 Conversations that were Family Oriented

If talking to participant at club or at home where they were accompanied by or refer to a close relative, I have analysed for a Family-type conversation component, especially where the diary entry or field notes account indicates a longer session talking to them. An example is with Andy, where I indicate that he 'was present' at the club and I analysed for 'Social' speaking but not 'Family'. But if Andy was with his father or he referred to a relative, then yes, it would be 'Family' talk; conversations within a family group setting, where Self makes comments relating to Others and various members of family, asking questions about who is related to whom. Old Bobby, who was in his early twenties when first meeting a white man, was intriguing with his stories about living as a bush Aboriginal. In the Southern Community, it involved me learning about history of the family that may have included war time experiences, dispossession of lands, remembering life as a child growing up on the Mission and being part of the stolen generation.

My memory never served me well, hence I was forever asking for reminders about an individual's family ties. Parents would update me about their children's whereabouts and achievements. These conversations centred around the social venues like the club, co-operative and at the home. In the Traditional Community, visiting the home meant sitting on the ground under the front verandah or under the shelter adjacent to the house. Only rarely did I enter an Aboriginal participant's house, only twice in the Top End Community, and the

owner was a teacher. Down in the southern community it was the norm, being invited inside, often for a cuppa and biscuit. Generally, when sitting around in a group setting, either at the Top End social club or the Southern Co-operative after work, group talk would encompass family talking. The context might have been sporting achievement, or individual family member achievement, and usually delivered with an obvious sense of pride. My being involved in these discussions happened right from the very start in the Top End, probably because of my association with some of their children at the Darwin school where I had taught.

Progressively I got to learn more about their family networks, how they are connected, who lived where and what they were doing. Sometimes there were oblique references to ceremonial matters, but not in any detail. Meeting with the 'mob' down South, in their homes, was a wonderful way of getting to know about each Aunty and Uncle, and their family histories. They would share any news with me, including their concerns. Opportunities for 'family' talk was more limited in the Centre Community, given the difficulty I had in understanding them. But when sitting with them either around the fire outside or under their verandah, conversation would include elements of family-related business. Another wonderful venue for family talk was in the car when driving to or from the cultural sites. Usually more so on the return journey after the work was done.

4.8.6 Signifiers of the Family Talking Type

An extract from diary, 12 April 1996, returning from a cultural site visit:

> *On return to [the Centre Community], Bobby tells me he doesn't smoke or drink – says it's silly – seemed disappointed when he asked if I drank.*
> *He's very concerned for his kids – keen to get Andrew on the job next time but will need to talk down price a bit.*

Family talks bore a strong association with place; hence I believe that the location was in itself a strong signifier of ‘family’ talk. In the Top-End community these locations were at the home, naturally enough, and the social club. The percentages for these two locations were 70% and 81% respectively. Family talking in these places was almost a given and the conversations would embrace topics such as sport, church, art, ceremonial connections to others, aspects of their kinship and moiety system, what different members of their family were doing and where they were, who was sick and how they were. The Centre and Southern Communities demonstrated a similar strong association between the home and family talking. Around the home and art-craft centre in the Top End, family discussions also embraced kinship aspects, such as displayed in works of art. Family-related discussions would also take place during the visits to the cultural sites, especially on the return trip when they were more relaxed.

It was not uncommon for me, while visiting the social club, to sit with the family groups that I had got to know well, sometimes settings of up to 10–12 people. Most of these people were either directly family related to one another or related through their kinship system. There was also considerable inter-connection of different families, through ceremonial and extended family ties. It may seem strange for the reader to see how the ‘family’ groupings associate within a work cell concept. Simply put, my sense of belonging and attachment to Community, and being seen as a true insider, was totally reliant upon my demonstrated acceptance by the family members. This acceptance and welcoming served as oil for the gears, because my connection to the participants and their families provided for the freedom and smooth running of the operation. As I have previously mentioned, I had by the third year of the book project, been granted the privilege of family membership, either as brother-in-law or cousin, in each of the three Communities. My working relationship with linguist assistant Andy, was significantly enhanced by my acceptance into his father and

mother's family as demonstrated by them appointing me as cousin to Andy. In the Southern community, I was referred to as 'Brother-in-law' by senior Aunty Lilly and I was really touched by it.

In the two traditionally based communities, every cultural site bore its traditional relevance to their family through the associated Djang or Tjukurrpa. The corresponding percentages for family talk for these visits were 53% and 63% respectively. Down in the Southern Community, where sadly much of the Traditional Knowledge has been lost, visits to the cultural sites still evoked a considerable component of family talking, a staggering 85%. The reason for this higher loading in the Southern community had everything to do with the effects and recency of the occupation of their country by white Australians. As the reader might expect, the home also had a consistently high association with family talks. The figures for the Top End, Centre and Southern communities were: 70%, 73% and 91% respectively. The higher value for the Southern community reflects partly on my having spent significantly more time in their homes, and also that communication with the Southern community participants was considerably easier.

When I returned to the Top-End Community in 2019, after an absence of twenty years, to fulfil the permissions aspects for this study my initial reception was understandably cautious and guarded. I was initially viewed as an intruder, but the moment, however, they realised who I was brought about a remarkable transformation. I was immediately welcomed back, quite emotionally in some cases, and received as a long-lost brother-cousin. Several people had lost close relatives in the preceding twenty years, so instead of talking to Jack I was now reminiscing with his son and grandson.

4.8.7 Conversations with a Project Talk Component

Talking ‘project’ business usually followed on from sometimes a very brief introductory social chat. These conversations mirrored the interplay between Self and the key Others, Community members who had a significant part to play in the research for and development of the fieldwork. In the two traditional Communities, these Aboriginal people tended to be more conversant in English. The Community members in this category formed two layers of participation. The first group represented the Traditional Owners or senior Elders, who by birth right were the Community’s acknowledged Traditional Knowledge custodians. Members of the second group were variously selected according to their technical, administrative and liaising or gatekeeping skills. Whereas members of the first group were clearly indispensable as the primary knowledge source, the second group were also indispensable for the ongoing development of the work. The second group formed as time went by through social conversation that revealed special skills they possessed, or by their association with recognised agencies within the Community such as the council, co-op, literacy centre or by family ties to the Traditional Owner in the Territory Communities or senior cultural custodian in the Southern Community. Often the second group would facilitate the work by providing feedback on the evolving draft iterations, resolving misunderstandings and communication breakdowns with the major Traditional Knowledge providers and providing technical and linguistic support.

This category embraces active discussion around structured interviewing and any aspect of activity that involved some degree of involvement with drafts for book development. This includes review and feedback sessions, visiting sites of significance accompanied by a TO or an Elder, with or without recording audio-visual data. These conversations involved any active input into the direct development of the book content. It included discussions during any reviewing and feedback sessions on the draft iterations.

Obviously, it involved the cultural site visits, and more structured interview style discussions. The participants were from both groups. The locations for these conversations were mainly at the cultural sites, but also included the homes, council building and outside settings – places where it was suitable for laying out the draft documents for review.

The analysis revealed three sub-categories to 'Project work' type talking: reviewing draft work, visiting sites and interviewing. In many cases, this type of talking involved looking at and reviewing with the Community members the draft iterations of the student trial versions. This would involve a structured, focused conversation with me pointing out and explaining various aspects of each page. Usually, the content material about the other two Communities generated more interest than their own Country. These review sessions were intended of course to seek their feedback but, in the process, I'd be trying to gauge their interest. The book's content was designed to be highly illustrated with diagrams and pictures, sometimes including photos of the main Traditional Owners and Aboriginal Elders, which on some occasions caused considerable mirth and delight.

The intention was to let them see how their personal efforts were contributing to the developing pages, and how their Community and Country was being represented. Visiting cultural sites necessarily involves focused discussion on the site and its cultural aspects. Often it was an informal question and answer format. The interviews were semi-structured with open-ended questions and often included a very informal and free-flowing discussion at the end when participants were invited to say anything else.

4.8.8 Signifiers of the Project Talking Type

This section builds on the preceding Section 4.8.7 by providing the details derived from the analysis that further define and clarify *project* talking. From the very beginnings of the original book project, I realised I was going to need ongoing confirmation and affirmation

of what I was documenting against the parameters of accuracy, interest and cultural sensitivity. Consequently, it became essential to seek feedback from those participants who were directly involved with and responsible for the Traditional Knowledge delivery. These conversations about the ‘project’ were conducted on a regular basis, and from a broad member base.

For me, it was a given that for the sake of the potential student readers, reliability, validity and sensitivity of the book’s content were of paramount importance. The only way I was going to achieve this standard was to collect the Traditional Knowledge from its primary source, the Traditional Owners and Aboriginal Elders themselves, and then repeatedly to go back and check with them what I was recording in the draft iterations. When analysing for research talking, my focus was on those actions or events that played a direct part in the book’s content development. I found that terms such as ‘reviewing’, ‘updating’, ‘getting feedback’ and of course, ‘visiting sites’, were the key gerund terms signifying my seeking approval and confirmation of the drafts. All aspects integral to the research and development phase of the book.

Understandably, the key research participants belonged to the Traditional Owner and Aboriginal Elder groups. There was however a second layer of participants who contributed to the research type talks because I had decided that I needed to broaden my review and feedback audience for the book’s content iterations. I did this not just for their own Community’s bookwork but also for the other two Communities as well. There had been culturally related ownership concerns raised behind this decision, so I had to check, for example, that the Top-End Community was happy for students from outside their Community to be reading about their Traditional Knowledge. And, of course, they were. The key locations associated with research talk consistent with all three communities was the Site

Visit. The respective percentages were 89%, 55% and 99%. The lower figure for the Centre Community is a reflection of my communication difficulties with the senior Traditional Owner.

4.8.9 Within the Project-related Conversations was the Occasional 'Dadirri' Moment

As previously mentioned, I decided to categorise conversations conducted while working on Country at the respective cultural sites, as Project related, but I found that there were significant differences to some of these conversations, sufficient to put them into a sub-group. The people belonging to this sub-group were the two older senior Traditional Owners, one from each Traditional Community. Both had been fully initiated and bore the customary scarification. My 'Project' talks with these two were mostly one way, more formal in their structure, and involved animated recounting of traditional stylised narratives from their oral history repertoire, for which they were the custodians. The two Traditional Owners would demand my attention when delivering their respective Djang or Tjukurrpa accounts while on site.

The Traditional Owners would sometimes check that I was paying active attention by asking in English 'Are you listening son?', as Aunty Penny from the Top End would ask, or it would be 'Listen to me' from old Bobby, the Centre TO. Both Traditional Owners would also continually point and gesture when emphasising important tracts from their narrative, indicating directions of travel by the ancestral beings. These experiences were an epiphany, occasions that were precious to me, moments of elation, humility and awe where I understood my position in terms of absolute privilege, because I was in the presence of living history. There I was, on Country and being in the company of these wonderful, learned old people, and realising that I was the very first and only person to ever record their traditional narrative, which otherwise would have been lost to all.

4.8.10 Conversations with a 'Cross-cultural' Component

I decided to use the term 'Cross-cultural' when referring to all conversations with the Aboriginal people in the two traditional Communities. My rule of thumb for 'Cross-cultural' verbal exchanges was based on the respective dominant 'mother tongue' spoken in the home. The participants in the Top End Community when conversing with me, would normally converse in standard English and, by the above definition, in a cross-cultural sense. The Community members my age or younger spoke quite good conversational English.

A smaller group were higher educated to senior secondary or post-secondary levels and would comfortably engage in more cognitively and conceptually demanding topics. This was mirrored in their everyday jobs, such as teaching or administrating. When I was present among them at social gatherings, they would sometimes lapse into their local language when circumstances, such as confidentiality or sensitivity of topic demanded. Bearing in mind that English was not their first language. The Centre Community Aboriginal participants also spoke reasonably good standard English, but the older participants struggled. The senior Traditional Owner that I did most of my work with and his wife both struggled with standard English, but we got by. Hence, I defined all of these conversations as Cross-cultural, certainly so when we negotiated payment for services rendered.

The participants in the Southern Koorie Community routinely spoke in standard English, as did the Aboriginal people in the southern areas of Australia. Interestingly, I did find that when in the privacy of their home, and particularly when talking to their younger children, they would lapse into Aboriginal English and would also do so with extended family members who are non-Aboriginal; indeed, I became quite comfortable 'talking Koorie' when mixing socially with the 'mob'. The younger kids usually talk in Aboriginal English as a matter of course. For the purposes of this study, conversing in Aboriginal

English is considered ‘cross-cultural’, and I have applied the term more in reference to Self, when conversing in the private home setting among the family, however, I have chosen to avoid cross-cultural labelling for public settings and for the purposes of this research.

4.8.11 Conversations with a ‘Revealing’ Component

On occasion and usually without prior notice, I would find myself engaged in a face-to-face conversation, and receive quite personal and sometimes sensitive information. Sometimes they would catch me on my own, their voice would be lowered, particularly if the topic involved someone’s death. Sometimes it was unloading concerns they were facing, looking for a sympathetic ear, and I would be an active listener but not comment. Occasionally I found the information quite useful by allowing for more strategic use of the time I had left in the Community. Often these conversations would be emotionally loaded. Sometimes the disclosure being aired was directed at me, perhaps over a perceived grievance or insult.

In some cases, as I was to learn in the Southern Community, the appropriate remedial action to defuse the situation was to consult with their close family members, siblings or children. More often than not the matter would be resolved after a little while. Nothing would be said to me, but it was apparent that the ‘difficult’ Other had been spoken to and our relationship would return to a co-operative, collaborative and productive normalcy. So, these ‘Revealing’-type talks were associated with revealing in both sensitive and emotional content. The analysis for the Revealing type talks displayed an interesting consistency between Communities, with frequencies of 20%, 19% and 20% respectively, which are comparatively lower when compared to the Social and Collaborative talks. Another consistency was that the Revealing talks started to occur roughly two years into the bookwork, for all three Communities.

4.8.12 Signifiers of the 'Revealing' Talking Type

My analysis revealed a further common trait for these Revealing talks, relating to their entirely unpredictable nature. I was on some occasions blind-sided by the sudden change in topic, completely inconsistent with the previous conversation and indeed the setting. Sixty per cent of 'Revealing' talks occurred at unlikely locations, with cases occurring where a participant would bump into me outside in the open somewhere, or at the store and then divulge some sensitive and disturbing news, which they obviously felt they had to share with me. Another common factor was the emotive loading, where emotions were clearly displayed. In the Top-End Community, the home, club and school all shared quite high counts of Revealing conversations. The majority of these cases were either positive or neutral in nature, with sharing personal, good news about themselves or next of kin. I would then respond in kind, sharing in their happiness, but in a minority of cases, the more upsetting ones, I struggled with how to respond.

One of my previously introduced participants in the Top-End Community, Rex, and his son, Kingsley, were both educated at the same Darwin school where I taught in 1992. In fact, Kingsley was still a student while I was teaching there. So, Rex and I had an immediate connection, and he felt he could share personal and family news and concerns with me as this 12 December 1998 extract from my diary shows.

> *Went after about 20 min. and saw Rex on way – spent some time talking to him. He looks well and is a lot happier and content. He had his new wife with him. His son came by and chatted briefly. He's very happy with his new job at DEMED, works in the office. Rex is very proud of him – he was paid a compliment about his son recently and he's tickled pink. He says*

that new town clerk is okay but they'll get someone better. Danny is all right, but lacks confidence. He and Jack are on council.

I had not spoken to Rex in over twelve months, and even though my last visit had been only four weeks previous, I had had to cut it short due to weather concerns. Rex obviously wanted to fill me in on the news and my reception told me that I was known and accepted as an insider, and that he was comfortable with me. These talks were also a wonderful source of insider knowledge, teaching me about the inner workings of the Community.

4.8.13 A Collegial way of Conversing

Not long into the bookwork field trips I realised that some participants, a smaller core of people, were engaging with me at a higher cognitive level, decidedly more intellectual, and importantly, more futuristic in style of conversation, concerning matters such as education and governance. These people were all relatively better educated in a Western sense, with secondary schooling to at least year ten, and several of them with post-secondary qualifications. These participants also indicated a perception of co-ownership, with a recognisance of their involvement in the overall project. In a very real sense, these participants were behaving collectively – more like colleagues. This is not to say that my conversations with the older Traditional Owners were not of an equally high cognitive level. I had one very interesting family-oriented conversation with Andy's dad, when we spoke about family matters and he expressed his concerns for his son's future and the loss of culture among the young. My problem was of course not being conversant in their language.

These conversational experiences were epiphanies, with the sudden realisation that I was being elevated to a level where Self was suddenly immersed in higher level conversations with the Other, moments that were revelatory in terms of their

acknowledgement of my presence, my level of acceptance and status within the Community. These members perceived a life and purpose for the bookwork well beyond the Community fieldwork and I found that I was responding to these people as colleagues. There was a sense of co-creation and shared ownership, that we as a team were co-working towards a common goal, and additionally, they were teaching me about aspects to the bookwork that I had not encountered before. These talks embraced the normal pattern of conversational flow, with the initial social chat, through to whatever collaborative element was appropriate, and then perhaps moving collegially onto the key issue at hand, which may have been a project-based discussion, a review of the current draft iteration and Self being treated to valuable and insightful feedback.

Consequently, I decided to label these conversations as *Collegial*. These Collegial talks occurred more often in the school or out on visits to sites, while the club, home and council venues provided further opportunities to engage with my colleagues. The Community value in the bookwork was often realised and raised in discussions that entertained how the project might serve the local youth in terms of cultural renewal, maintenance and improved understanding of their own local Traditional Knowledge. Occasionally the conversation extended to beyond the immediate Community needs, such as providing mutual benefit for both black and white students, with a potential role perceived in the empowerment and self-determination process for Aboriginal people.

To sum up this section, I would suggest that Collegial Yarning may also be seen as an indicator of a professional type of conversation where the participants, Aboriginal and non-Aboriginal, are stakeholders in a joint enterprise, the co-production of an Earth Science textbook which embraces both the Aboriginal and Western Science worldviews. The

Collegial Yarning process communicates the joint effort that combined the Aboriginal knowledge base with the Western Science, both in equal standing.

4.8.14 Signifiers of the 'Collegial' Talking Type

The analysis of my '*Collegial*' type conversations with this smaller group of participants revealed some consistent and interesting findings.

Table 4.2 indicates the modes of communication with individual Aboriginal participants and the loading of Collegial talks with each one.

Table 4.2 Participant Modes of Communication Versus Percentage Collegial Talks

Community	Participant	Mode of Communication					Colleg. talks	% Colleg.	Place of Face-to-Face Contact					
		Phone	Fax	Letter	Message	Face to Face			Home	Club	Co-op / Council	School	Various	Site
Top-End	Jack	2[1]	2	2	1	39[2]	32	82[3]	18	15	0	0	3	4
	Rex	1	0	0	0	20	3	15	156	10	3	0	0	1
	Hetty	3	3	1	1	11	11	100	3	0	0	7	0	1
Centre	Lenny	2	0	0	0	7	3	42	2	0	2	0	2	1
Southern	Darcy	65	3	4	6	83	76	92	16	15	26	1	22	19
	Lilly	3	1	2	3	23	10	43	1	0	14	0	6	0
	Tom	7	1	1	3	77	59	77	42	0	4	0	8	19
	Lisa	7	0	1	0	12	7	58	6	0	6	0	2	1
	Mick	5	0	0	1	8	5	63	0	0	6	1	0	1
	Sally	11	0	0	1	7	5	71	0	0	6	1	0	0

[1]Value expressed as frequency count.
[2]Value expressed as frequency count for all face-to-face conversations with participant.
[3]Value expressed as percentage of all talk types.

Without exception, I had engaged with each Collegial participant in more than one mode of communication. Aside from our face-to-face conversations, the most common alternative being the phone. Hence, the communication styles were more complex and varied than for the average participant. Furthermore, the educational standard for these participants was generally higher as well, and this was most evident for the Top-End Community, three of whom were trained primary teachers. The three Collegial participants in the Top-End

represents about 14% of the 22 involved in total, while for the Southern Community, it was 6 out of 16, or 38%. Everyone in this Collegial group demonstrated an ability to communicate their opinions and ideas about the bookwork that transcended the immediate here and now. They each recognised broader ramifications for the book, particularly in a reconciliatory sense, conceptualising and opining the view that the book provided a vehicle for the merging of worldviews, with 'Bininj [Aboriginal] learning from Balanda' [white] as the Top Enders would say, one learning from the other, working together towards the future.

4.9 The Community's Unique Talking Spectrum

Table 4.3 Total Talk Types with Aboriginal Community Participants

Community	Days	Aboriginal Participants	Talk types face-to-face						
			Social	Collab.	Project	Reveal	Family	C-C	Colleg.
Top End	65[1]	21	208	165	135	99	65	187	33
Centre	55	21	93	78	60	43	31	91	0
Southern	185	16	279	224	203	117	96	0	177
All	305	58	580	467	398	259	192	283	210

[1]value represents frequency count

The total talks per Community correlates with the number of days spent in each. It should be noted that all these conversations were conducted face-to-face. Interestingly, I also found that when the phone conversations were included in the overall tally, very little difference was noted in the composition of the talk component spectrum. When each Communities' conversations are expressed as a percentage of type against total conversations, the results are quite illuminating:

Table 4.4 Talking Type as a Percentage of Total Talks for each Community

	Conversation type as percentage						
	Social	Collab.	Family	Project	Reveal	Cross	Colleg.
Top End	100[1]	79	65	48	31	90	16
Centre	100	37	29	21	15	44	0
Southern	100	80	73	42	34	0	63

[1]Value represents percentage of total talks

Both the Top End and Southern Communities reveal reasonably consistent results for conversations with each of the Collaborative, Family, Project and Revealing components. This was probably reflected in part to the ability in the Top End to sit with the participants either individually or in their family groups, talking socially and family. The higher percentage of Family component talks with the Southern Community is consistent with the greater percentage of home visits. Bearing in mind, too, that the 'home visits' for both traditional Communities were rarely conducted indoors but usually on their porch or under the shelter adjacent to the home.

4.9.1 Weightings of Talk Type for All Three Communities

During later analysis stages, I tallied the totals of each talking type for all three communities. These are shown in Table 4.5.

Table 4.5 Community Talk Types, Aboriginal and Non-Aboriginal participant comparison

COMMUNITY	Face-to-Face Talks	Aboriginal Talk Types							Non-Aboriginal Talk Types		
		Soc[3]	Fam	Collab.	Proj.	Rev	C-C	Colleg.	Soc	Collab.	Proj
Top-End	Total Talks	222[1]	131	131	71	45	195	36	99	96	7
	% Total	100	59	59	32	20	88	16	100	97	7
Centre	Total Count	94	42	42	38	21	77	0	98	83	3
	% Total	100	45	45	40	22	82	0	100	85	3
Southern	Total Count	431	214	214	75	80	0	225	83	79	16
	% Total	100[2]	50	50	17	19	0	52	100	95	19
All	Total Talks	747	387	387	184	146	272	261	328	306	19
	% Total	100	52	52	25	20	36	35	100	93	6

[1]Values representing frequency count for talking type.
[2]Values represent percentage of talk type against total talks.

4.9.2 The Aboriginal Participants

Social talk was a universal aspect of all conversations regardless of the participant's Aboriginality. The non-Aboriginal project talk weighting was significantly higher for the Southern Community – 19% of the total talks compared to 7% and 3% for the other two Communities. The reason for this was essentially the greater diversity of content for the Southern Community book. And this in turn reflected the greater diversity within the Southern Country and the need to address the science and technology related requirements for the attendant earth sciences. As a rule, for every aspect of Earth Science contained within the book's content, I required consultation and engagement with at least one expert scientist and these participants were non-Aboriginal. These conversations were less frequent than with the community members and out of necessity were essentially business-like and strongly focused on the project work. No time, or very little, for family talk. For the Aboriginal participants the Collaborative talks were quite similar in weighting, 73%, 71% and 84%. These high values reflect the commonly understood reason for my presence in their Community, essentially to get the job done.

The two traditional Communities show a higher percentage for the Project talks, 32% and 40%, compared to the Southern Community's 17%, reflecting, I would suggest, the greater cultural density of their respective traditional knowledge base. To be fair, the reader should bear in mind here the tremendously sad and tragic loss of culture-related knowledge from the Southern Communities, mainly during the early intervention days of the 1800s by White Australia. This in turn also reflects the smaller number of Aboriginal participants, the cultural officers, that are available in the Southern Communities who have the traditional knowledge and are prepared to share and contribute to book projects similar to mine.

A greater consistency can be seen among all three communities for the percentage of Revealing talks, 20%, 22% and 19%. There appears to be a somewhat common need for people to share their personal concerns. I have previously mentioned that each Community took the same time before participants commenced engaging in these types of talk, about two years in from the commencement of the visits. I will at a later stage address the connection between these Revealing talks and what I term 'Uplifter' and 'Downer' events, or key moments that had a significant impact on Self and Others. I found that family talking shared a similar weighting consistency for all three Communities, indeed, it would appear as a given that Aboriginal people will, when in the right context and situation, talk about their family in some guise or another. The slightly higher value for the Top End, 59%, compared to 45% and 50% for the other two, possibly reflects the greater time I had talking with participants in their Community's popular venue, the social club. In any event, the fact that family talking occurred in about half of all conversations is pretty telling.

The weightings for Collegial talk, 16% Top End, 3% Centre and 52% for the Southern Community probably reflects, in terms of English languages, the differences in average educational levels for each Community. My inability to speak in language obviously reduced

opportunities to conduct higher level conversations with Aboriginal people, and conversely their ability to express themselves in English impacted on their ability to voice the higher-level concepts and constructs pertinent to Collegial discussions.

4.9.3 The non-Aboriginal Participants

As an introduction to this section, I would like to explain one obvious difference between the Aboriginal and non-Aboriginal sets of participant data, that being the narrower range of talk types analysed and shown for the non-Aboriginal participants. This was due in the main to always being on task and fully engaged in 'Project'-related conversations when meeting with each of these participants. Usually, there was precious little time to talk about other matters because I was visiting them at their workplace. It was always a case of 'time on task', and I was very conscious of their occupational pressures.

The non-Aboriginal involvement and input into the project was equally critical to the book's success in areas that complemented and supported the traditional knowledge content, particularly the linguistic, translational and science-related content. In the two traditional communities, my engagement with the non-Aboriginal Community members, although peripheral, was unavoidable, as their involvement was essential to the proper running of the community, from the point of view of community administration, operation of essential services (power and water), school, art-craft centre, council, literacy or linguistic centre and the social club in the top-End community. My conversations with the non-Aboriginal participants were in the main more business-like, and very goal or task oriented. Conversations extending to their private lives and families were extremely rare. Their roles

were voluntary and entailed assisting either with development of the Earth-science-related content or the translation/transcriptions for the Dreaming accounts.[7]

Both Communities had their own linguist who was indispensable for developing the respective traditional dreaming account into English. The Top-End Community had Andy, an Aboriginal assistant, who I was more involved with. Governance of the Communities was by non-Aboriginal folk, and my interaction with them was determined by the need for permits and requesting office workspace and occasionally a 4WD. Every Community arrival commenced with a routine council visit, where I would be briefed on recent Community happenings, especially ones that may have impacted on my work. Knowing about 'Sorry Business' was important, as it informed the way in which you approached and spoke to people, especially the close family members. This was particularly so in the Centre Community, where there was much less contact history with white Australia than for the Top-Enders.

4.10 Community Location Linked to Unique Talk Type Spectrum

The analysis indicated a tendency for a specific spectrum of talking types to occur at each of the key Community locations. These were identified from frequency count analysis of locations where significant interpersonal conversations were conducted, as indicated by the diary and field notes accounts, during the book project. Generally, each defined location featured sufficient talk type frequency counts to warrant identification, but some locations were too low in count, and I made the decision to collectively include these places under the 'various' label.

[7] I have used 'account' as the preferred term instead of the oft-used 'story', in deference to Aboriginal views of the authenticity and validity attached to their Djang and Tjukurrpa songlines.

To further provide the reader with the situational context and dynamics behind the Community's social networking, I have adopted a diagrammatic representation, presented in figures 4.12 to 4.14, which provide information on the talking types attached to, and movement between, the different locations in each Community. The reader should view the size of each circle, denoting a location, as being proportional to the total number of conversations conducted there. Furthermore, the arrows indicate the typical point-to-point movement between locations, and the arrow weight is proportional to the number of travels between any two locations. Hence, as an example for the Top-End community, the travel between 'home' and 'social club', and 'home' and 'site visit' occurred more frequently than others. To simplify matters, I have omitted any reference to my own accommodation, because I generally kept away from my 'quarters' during the day, when the focus was on visiting other locations.

I should emphasise that each Community's schemata in no way represents their actual ground layout. The diagrams are purely designed to assist with conceptualising the mechanics and patterns of movement behind the conversations. The reader can however gain some sense of proportionality for the number of conversations linked to each Community location by the circle diameter, and the movement between locations by the weight of the arrow. Also, the scale for the Southern diagram is half that used for the other two, to allow for the fact that significantly more time was spent with the Southern mob. The number of days spent visiting the two traditional communities were 63 in the Top End, and 49 for the Centre, totals that are not too different and reflect the practical need to combine visits to both traditional communities during each Northern Territory trip. These two respective totals however pale against the total of 133 visits for the Southern community, reflective of the greater complexity associated with many aspects of the Southern Community bookwork.

4.10.1 Locations of Social Interaction – the Top-End Community

Figure 4.12 Top-End Community: Talk Types at, and Movement between Locations.

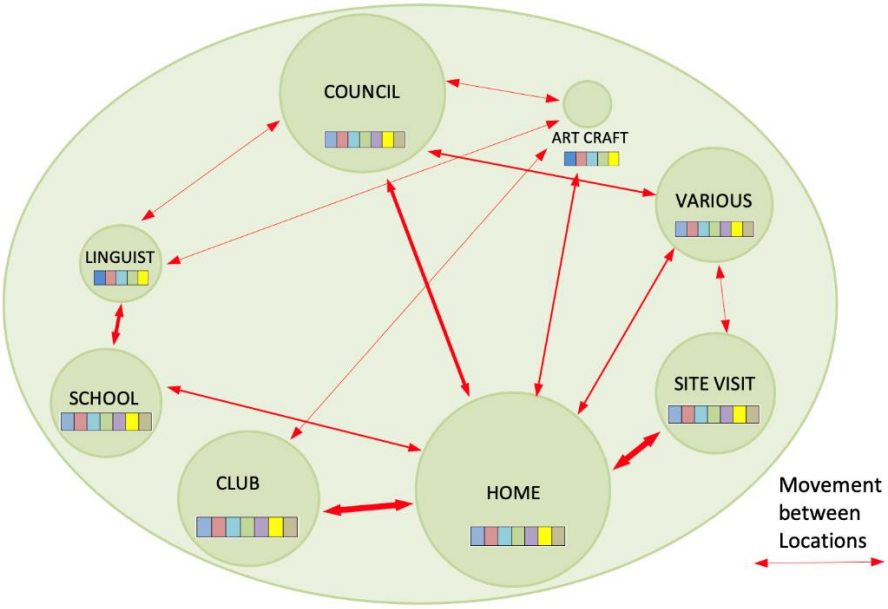


Table 4.6 Talking Types at Specific Locations in the Top-End community

Location	Top-End Community – Talk Type						
	Soc.	Collab.	Family	Proj.	Reveal	C-C	Colleg.
Art-Craft	100[1]	100	67	83	17	100	0
Club	100	62	81	17	32	100	8
Council	100	94	54	41	18	100	6
Home	100	80	70	47	23	100	11
Linguist	100	100	38	50	0	100	0
School	100	85	40	70	38	100	33
Sites	100	89	53	89	16	100	33
Various[2]	100	60	100	0	60	100	0

[1]Values are expressed as a percentage of total talks with participants at that location.
[2]Other locations include being outside in the open, church, store.

4.10.2 Locations of Social Interaction – the Centre Community

Figure 4.13 Centre Community: Talk Types at, and Movement Between Locations

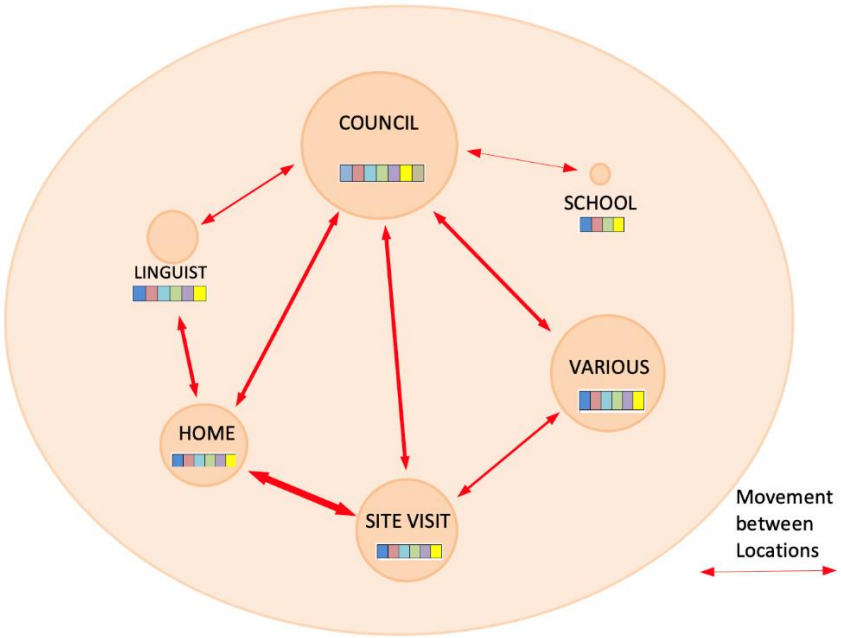


Table 4.7 Talking Types at Specific Locations in the Centre Community

Location	Centre Community – Talk Type						
	Soc.	Collab.	Family	Proj.	Reveal	C-C	Colleg.
Council	100[1]	92	44	26	25	100	3
Home	100	68	73	49	35	100	0
Linguist	100	100	50	100	50	100	0
School	100	100	0	50	0	100	0
Sites	100	98	63	55	24	100	0
Various[2]	100	100	33	33	33	100	1

[1]Values are expressed as a percentage of total talks with participants at that location.
[2]These locations include outside in the open, and church.

4.10.3 Locations of Social Interaction – the Southern Community

Figure 4.14 Southern Community: Talk Types at, and Movement Between Locations

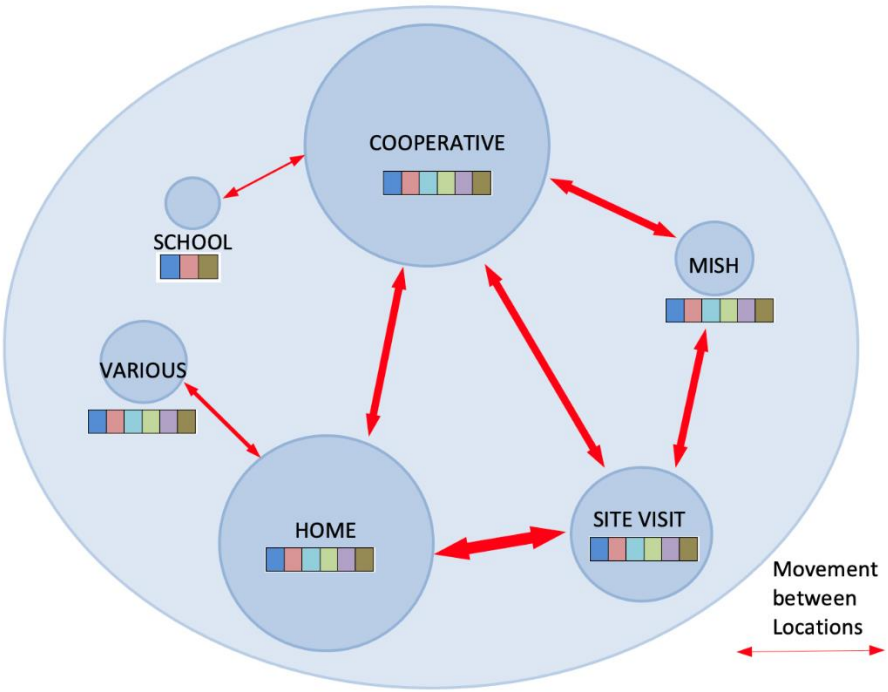


Table 4.8 Talking Types at Specific Locations in the Southern Community

Location	Southern Community – Talk Type						
	Soc.	Collab.	Family	Proj.	Reveal	C-C	Colleg.
Co-op	1001	88	76	38	53	0	52
Home	100	75	91	39	61	0	38
Keeping Place	100	89	83	89	22	0	67
Mission	41	14	22	2	3	0	6
School	100	100	0	0	0	0	100
Site Visit	100	100	85	99	67	0	80
Various[2]	100	71	59	38	35	0	56

[1]Values are expressed as a percentage of total talks with participants at that location.
[2]Other locations include café, pub, church, funeral.

4.11 Community Location and Conversation Component

Table 4.9 Community Face-to-face Talking Locations

Location	Community		
	Top End	Centre	Southern
Airfield	2[1]	6	1
Art-craft	8	2	1
Church	2	3	3
Club/Pub	24	0	3
Co-operative	0	0	40
Council	24	17	0
Keeping Place	0	0	5
Government Agency	3	0	19
Home	35	18	65
Hospital	1	0	3
Linguist	11	11	0
Mission	0	0	18
School	24	24	16
Store	6	6	1
Site (guided)	6	6	51
Site (un-guided)	30	30	26

[1]Frenquency count of visits to location.

My analysis identified the specific Community locations where the majority of conversations were conducted. The ‘council’ office was unique to the two traditional Communities, while the ‘co-operative’ in the Southern Community, an approximate equivalent, plays a broader role within the Aboriginal Community there. The ‘Keeping Place’, also unique to the Southern Community, is a centre dedicated to preserving traditional culture and artefacts.

The verbal face-to-face exchanges that took place in each location would necessarily have involved more than one type of talking. Usually, you would start with a social chat then move on to family talk or a more formal collaborative conversation. What was evident, often, was there seemed to be a dominant style of conversation identifiable with each location. I

also found that the location would often determine the frequency distribution of the components of the conversation.

Table 4.10 Average Talk Component for a Given Community Location

Location	Community	Social	Collab.	Family	Project	Reveal	C-C	Colleg.
Home	Top End	26[1]	19	19	10	5	19	2
	Centre	19	13	10	9	6	19	0
	Southern	26	18	24	9	15	0	26
Council/Co-op	Top End	25	24	13	10	4	24	<1
	Centre	24	22	8	5	5	22	<1
	Southern	24	21	18	9	12	2	13
Site/Drive	Top End	23	19	14	19	5	23	6
	Centre	24	24	13	11	5	24	<1
	Southern	19	19	16	19	12	0	16
Other	Top End	25	12.5	25	0	12.5	25	0
	Centre	25	25	0	25	0	33	0
	Southern	34	9	27	7	13	4	3
School	Top End	23	19	9	15	8	21	6
	Centre	29	29	0	14	0	29	0
	Southern	33.3	33.3	0	0	0	0	33.3
Linguist	Top End	26	26	10	13	0	26	0
	Centre	20	20	10	20	10	20	0
	Southern	0[2]	0	0	0	0	0	0
Club	Top End	27	15	21	4	7	25	2
Art-Craft	Top End	24	24	16	20	4	12	0
Store	Top End	25	25	6	6	6	25	7
Mission	Southern	41	14	22	2	3	0	6
Keeping Place	Southern	22	20	19	20	6	0	14
Conference	Southern	29	29	12	0	0	0	29
Work	Southern	23	23	11	15	4	0	23

[1]Values are expressed as a percentage of total talks with participants at that location.
[2]There was no equivalent location in the Southern Community.

4.12 Participant Role and Talking Types

This section builds upon the information presented in Chapter 4, sections 4.7 and 4.8 where the reader was introduced to details about the talking types and their signifiers as revealed by the analysis. It further develops the themes relates to the range of conversations I had with the participants, and where the conversations took place. For example, the analysis revealed a pronounced tendency to engage in the 'Project' talks when, and where, we were collaborating on different aspects of the work. The primary traditional knowledge providers were the most prolific 'Project' talkers, mainly because I spent more time with them. While these sections referred to the Aboriginal participants in general terms the reader will be reminded that there was no attempt to focus on specific participant role models apart from Chapter 4, Section 4.8.9, which focused on the two senior Traditional Owners in the context of the Dadirri moments. The following section, 4.12.1 devotes additional information gleaned from the analysis that describes the important work, in the context of talking types and Community locations, for the small group of Community participants I have termed the liaison–facilitators.

4.12.1 The Community Liaison–Facilitator

When I look back on my community experiences, it is apparent that for each community there was one Aboriginal person who was central to the overall book project, playing a dual role of traditional knowledge provider, and liaison–facilitator. In each Community they introduced me to the main traditional knowledge provider and in the two traditional Communities facilitated my initial conversations with the Traditional Owner. They were able to facilitate, negotiate and occasionally arbitrate access to the various social networks that were instrumental in achieving outcomes within the Community fieldwork setting. They acted variously as friend, contact and often as a colleague, and they were

willing to vouch for my presence in their Community as a researcher and the value of the research. Without their influence and support progress would have been much slower.

The analysis also demonstrated that these liaison–facilitator people, characteristically and voluntarily, performed roles that can be described as enabling. Conversely, at times they made me realise, usually a lot more promptly, that there were *inhibiting* influences blocking progress. Aside from actively seeking to 'do things the proper way', I was always looking to establish consistent routines and processes that would facilitate my research and development journey. In some cases, these facilitatory processes only became apparent afterwards, when I had time to reflect on my progress. Hence, the benefit of writing diary notes and particularly field notes.

The analysis indicated a greater number of conversations were held with the liaison–facilitator for both the Top End and Southern Communities. These conversations were also more likely to have been conducted by phone, and there were also a greater number of points of contact within their Community. Table 4.11 reveals the differences in modes of communication and talk types between the liaison–facilitator and the average participant.

Table 4.11 Communications with the Facilitator–Liaison Compared to Average Participant

Community	Phone	Message	Letter	Fax	Talks	Social	Collab.	Family	Project	Reveal	C-C	Colleg.
Top-End Liaison	3[1]	1	4	0	39	39	39	37	21	20	19	38
Top-End Average	<1	<1	<1	<1	12	11	9	7	5	4	10	2
Centre Liaison	0	0	0	0	8	8	7	5	7	3	8	0
Centre Average	0	0	0	0	4	4	4	3	2	1	4	0
Southern Liaison	65	6	4	3	82	82	80	49	35	9	0	76
Southern Average	9	1	<1	<1	17	17	14	13	7	6	0	11

[1]Values shown are total frequency counts.

4.12.2 Case 1: Jack – the Top-End Liaison–Facilitator

Jack filled several roles for me during the fieldwork period. He was a Traditional Owner with rights as a traditional knowledge provider, he was able to provide the necessary interpretations and explanations that bridged the cultural and Western gap for the bookwork. He was originally trained as a primary teacher, but had since been elevated to administrative and advisory roles for the Community. Finding time to spare for me was often a challenge for him. As this extract from the 27 September 1995 indicates:

> *Jack is a bit difficult to pin down, but when you do, and he has got the time, he is of absolutely fantastic value. You get that earnest and sincere input. He is able to comment quite critically from both worldviews, and as Patrick [NT Gov. officer] has said, he is one of the few Aboriginals in this region that has his feet firmly planted in both worlds. Simply from that perspective he is of excellent value in terms of feedback and critical analysis on how the work is developing, and I appreciate his output very much so.*

An earlier conversation on the same field trip gave me further insight into the positive impact of the book project work within the Community, and its links to the local youth.

> 25 September 1995 –
>
> *Jack then proceeds to explain how Danny, and he are trying to create a new ceremony based on the 'Goanna Dreaming' – he sees this as a way to maintain the culture among the younger ones – both male and female. He said that my work would help with this but in a different way, at school. I commented that it would also assist kids down south. I suggested that a*

video might be an idea – but no! Younger ones would need to come out here. I asked Jack about idea of a ranger from Kakadu being a role model for the unit – he thinks this idea worthwhile, but a bit early yet, may need to wait a year or so, as the Aboriginal rangers have only just been appointed – Jack said it would be important for the ranger to come from this country. Jack will see me Wednesday morning, he sees the benefit in sitting down with me, and looking at the promotional materials – seems quite keen, but I know that time will tell!!

Wednesday 27 September 1995 –

Meeting with Jack. Location: Shelter, opposite home.

During the discussion, Jack reiterated the idea that this schoolwork will help retain the kids' culture and I guess a classic example of that was the rock diagrams of the fish and I mentioned that I was going to try and put these in the unit, alongside actual photos of the fish, so that the kids could see from both worlds how the fish are represented, and with some notes on the fish and so on. He understands that I need to keep coming back and seek his advice and the others too, to ensure the accuracy and detail of the cultural content, and that I am getting everything right, and he agrees with that. He's more than happy to give his time because it was for the kids, but he also said it was for the Balanda kids, which I think shows real wisdom because both sets of kids will benefit from this cross-cultural stuff.

Friday 5 July 1996: Clarifying issues about interference from traditional practice.

I also asked Jack about possible problems with older people, who've contributed to the project, passing away and how the cultural taboo rules would affect the materials use in future. Jack seems to think that there will be no problems here since there are precedents already – he mentions name of his senior deceased people when discussing his own initiation/ceremonial stages with his own peers etc.

In brief, Jack was my primary Top-End supporter, and his advice and guidance were instrumental to the book project's success. He had the status, influence and clout to help get things done. He has since passed away, and I know his Community miss him. But his son and grandson continue the good Community work today.

4.12.3 Case 2: Lenny – the Centre Liaison–Facilitator

Lenny had been educated at a secondary school in Alice Springs to year ten, and his command of English was testimony to this. He provided me with several initial contacts among the local senior men, explained the purpose behind my visits and facilitated the eventual development from an appropriate Tjukurrpa for the bookwork.

4 October 1995 –

Returned to rock seat area outside council office, close to fuel depot. Lenny (assistant coordinator of outstations) was present, and old Billy (local traditional landowner) was also there. Lenny has told me he that he informed everybody of my curriculum development purpose for trips. He describes this in terms of doing schoolwork for the Aboriginal kids – and they understand my intention to combine local traditional knowledge and culture.

10 April 1996 –

Back at council I met Lenny., who suggested I speak to Bobby – but he charges. Bobby came over to his 4WD and Lance spoke to him – he suggested $500 for 1–2 days – I explained that this was too much'.

11 April 1996 –

Went to Lenny's – at lunch, gave packet of bubble gum to son – saw Lenny later in afternoon at workshop, showed him the photos.

4 March 1997 –

[The linguist] suggested I ask Lenny about the guardians (owners) – Billy for Dingo Dreaming, also old Mack (custodian). Randy is the one for the Perentie Dreaming. Like many of his peers, Lenny was proficient in four Aboriginal languages. His knowledge of the inner workings of the community and its people provided a valuable source of assistance for me, especially during the early days of the fieldwork.

4.12.4 Case 3: Darcy – the Southern Liaison–Facilitator

Speaking as Self – as an Extended Family Member/Field Researcher

I've just realised the time. It's well after school hours, but I'm engrossed with my 'second job', my passion. I grab the phone and dial. A couple of rings later, and we start our chat.

Darcy: *How are you going?*

He'd already worked out it was me on the phone. We'd developed a well-rehearsed pattern by now, some two years down the track. It's about the usual evening time for a catch-

up and a number of days since the last call. I ring Darcy regularly as he has his finger on the community pulse, he's my go-to person to keep in touch and informed about community events, happenings and the politics. Darcy's my key informer and facilitator, community liaison person who keeps me in the know. And I need to keep him up to speed with where I am at with the work.

Me: *Yeah, pretty good thanks. How's everyone going?*

By now it's a well-established routine. First a bit of chit-chat, asking after everyone and so on. The social talk continues for a short while and then onto a bit of project stuff, into the collaborative conversation, the nitty-gritty. Telling him where I'm up to with the project work, and what help I might need from him. And then, out of the blue, Darcy bowls me a wobbly.

Darcy: *So…, what are you going to do with all this when the books are finished?*

Me: *(Pause) … Oh…, what do you mean?*

To me the books were the end, and I mean the living end. That was it, *finito*, I mean my family had had enough of me being absent! So, I wasn't sure what he was on about, and this was a totally different spin from our usual banter, our normal social, collaborative and collegial chat.

Darcy: *Well, I reckon you should be telling people, other teachers and the like, all about what you have been doing here. Tell them about your journey, and how you became accepted by the community and so on. You know, to show others, to teach them how to do it.*

25 Mar 1996

Phoned Darcy re weekend – He said that I will need to start working through other senior people, that Uncle Tom will come good in the finish, but I need to talk with Aunty Lilly, Uncle Jack, etc. Darcy will speak with Aunty Lily. No point talking to him or Shelly now. Said I should see Aunty Lily and get her to direct me to Darcy, i.e., give [him] some authority. Darcy also suggested I work through Uncle Tom's sister (Aunty Annie), get her on side. He agrees that it should only be a matter of time. He thought that the idea of me spending a day with Uncle Tom at his job was a good one.

Darcy was tertiary educated and had worked for several years in both state and commonwealth government jobs. He was regarded as a spokesman for the Community, and his advice was sought by Aboriginal agencies, both at state and local level. He was also a free thinker, indicating an ability to think outside the circle. He was a member of a small but influential group attached to the co-operative who, at my initial meeting with them, saw the value in what I was trying to achieve. His advice, guidance and support for my work was key to the eventual success of the bookwork. The number of times he smoothed my journey through difficult passages of the project was telling, and indicative of his belief in the value of my work. His ability to liaise with several key participants in the early days of the original research was critical to establishing the essential social support network.

4.13 Experiencing 'Uplifter' and 'Downer' Moments

This section builds upon Chapter Four, Section 4.12.1, where I first introduced the concepts of 'enabler' and restrainer', by providing further context to their involvement in the story of my journey from Country to classroom. Experiencing 'uplifter' and 'downer'

moments were seemingly, from a reflexive perspective, an integral and inescapable component part of the book project's field trip research journey. The literature identifies these moments as *enabler* and *restrainer* events (Okkonen et al., 2018). When I analysed for the enabling and inhibiting events indicated in the diary entries and field notes, the resultant percentages were 80% to 20% respectively, a pretty fair indication that the original research journey was a positive experience, with only a few hiccoughs along the way. This fifth strand of enquiry arose out of a deeper analysis of events associated with a higher emotional loading, in either a positive or negative sense. These events are mirrored by a higher incidence of the 'Revealing' talk component.

4.13.1 A Rationale for Recognising 'Uplifter' and 'Downer' Moments

It had become very clear when reading through the diary and field note entries, that there were events interspersed through the fieldwork journey that carried a marked emotional loading. So consequently, I decided to search the analysis in a different direction and deeper dimension, by looking for the tell-tale 'uplifter and downer' moments; occasions throughout the original project that had either an enabling or conversely, an inhibiting, restraining effect on the book's progress, and specifically for the conversations that arose during such occasions. A preliminary analysis, simply by doing a frequency count of significant positive and negative experiences, returned total counts of 230 to 59 respectively for all three communities. So, it's fairly obvious that I was not being a martyr in doing the fieldwork because, even though it was gruelling at times, the highs definitely outweighed the lows.

Enabling events involved a range of social events including simply attending a regular scheduled Community social event, such as church, the social club, and outdoor musical performances or sporting events. Occasionally, I would find myself standing around outside in the open with a family group, talking to one or more of them about issues that might have

related to school or health matters. These occasions provided wonderful opportunities for mutual trust and understanding to develop at a more personal level. These were times when the key participants were more relaxed and tended to talk more about family-oriented matters, and for them to learn more about me and my family. These occasions also provided ideal opportunities to arrange for valuable research-related meetings later in my stay. These social occasions also provided opportunities to learn interesting insider glimpses of how the key players perceived matters, Personal, Community and Project.

As each Community got to know me better, their levels of trust obviously increased because after a year or so key participants in each of the Communities began to divulge personal issues and concerns, their anxieties and aspirations, obviously looking for some feedback on, or reinforcement for their views. On one occasion, after church, an unsolicited comment from the pastor revealed a perception similar to that of the Top-End senior artist: that urbanised Aboriginal people were not seen by the traditional ones as all equal. The term 'coconuts' was used, brown on the outside, but white on the inside. Collectively speaking, occasions like this were strong motivators because they provided insight into how my work may do some future good in bridging two worldviews, a wonderful stimulus for getting on with the job.

Naturally enough, I encountered situations that proved to be restraining or inhibiting; occasions that were often accompanied by negative feelings ranging from frustration, disappointment and concern through to absolute despair and anger. For many of these occasions there was no prior warning, or at least not to my inexperienced eye, and usually they were due to circumstances well beyond my control. One vexing issue common to all three Communities related to payment for services rendered. In the Top-End Community this occurred once, very early in the fieldwork when the two Traditional Owners indicated they

wanted payment after a significant site visit. I was more surprised than anything else but, doing the right thing, I spoke to others to determine what the go was. Apparently, words must have been said behind the scenes, because I was never asked again. It was understood too, right from the very beginning, that the work I was doing was equally for their children, so perhaps the Traditional Owners were reminded of this. I did however routinely acknowledge the help the Traditional Owners gave me, particularly the more senior ones. I would buy them little gifts as a thank you, which were appreciated. Payment for service was, however, well established in the Centre Community, so, I was generally able to predict when and where, and then allow for it in my budget.

There were times though when I was caught by surprise, and embarrassingly so. Such a time was when old Bobby unexpectedly asked me to take him and his family out to two cultural sites, both associated with his 'birthing' and song line. This happened towards the end of that particular field trip mentioned above, so I immediately felt obliged to tell him I had no more money left. He laughed, and chided me. I realised then that I was simply being asked for a family favour. I was embarrassed. There was another occasion in the Southern Community when the issue of payment for service arose. The request came completely out of left field, and I was stunned, and very much confused, as it occurred three years after commencing the fieldwork. I mean, I was at the 'maintaining' stage of social support networking and things were predictable, were they not? While it is not appropriate for this study to describe the actual circumstances, suffice it to say that the matter did take some time to resolve, and it involved my requesting support and advice from the immediate family. Interestingly, resolution involved me acting both as negotiator and arbitrator between the aggrieved and the co-operative and secured him some paid training. This was definitely one time when I realised that my science teacher cum field researcher status lay well outside the now expected arbitrator job profile.

Given the protracted timescale for the original field research it is not surprising that in the two traditional Communities cultural and ceremonial events would coincide with a visit. On several occasions a death occurred either just before I arrived or during my stay. The Community would ‘stand down’ and comply with the ‘sorry business’ protocols, and any prior arrangements had to be put off until the next trip. Similarly, on two occasions, I arrived at the Centre Community to find old Bobby away on ‘Men’s Business’. Apparently, communication links with these old men were unreliable. Disruptions also occurred in the Southern Community but to a lesser extent. In fact, the inhibiting effect of a death and subsequent funeral was balanced by the enabling aspect of being able to meet up with family members that I hadn’t seen for some time, and provided an opportunity to meet new family members. Attending these family events, as sad as they were, had a strong bonding effect with key family members, enhancing my extended family member status.

I found that the restrainers – factors that restrained my fieldwork progress – represented a far higher proportion of the total enabler–restrainer count in the two traditional Communities. The Top End community was 78% to 22%, the Centre community was 67% to 33% while the Southern community was 86% to 14% respectively. These comparative figures are not surprising when you take into account the far stronger traditional observances in the two traditional communities, plus the vexing issues related to the field trip logistics and associated costings. I found that many of the restrainers were logistics related, practical matters such as accessing accommodation and transport. Securing adequate accommodation was one issue that occasionally presented problems. Having a secure and comfortable place to live was essential, and this was not always guaranteed. The frequent, absolute need for vehicle access for fieldwork also created problems. Generally, I drove to and from the Community, and the 4WD rental fees constituted the major cost for the fieldwork.

The need to fly into the Top End Community during the ‘wet’ season would mean that I had to arrange to borrow a 4WD, which did happen occasionally. Otherwise, visits to cultural sites were out of the question. Although infrequent, I did have to access the Centre Community by air too, generally in September when roads were closed due to thunderstorm activity. I was never able to access a vehicle there, hence limiting what I could achieve in the time available. Language barriers was another limiting factor, although I was able to communicate reasonably well with most of the participants. The language barrier was greater for the Central Community and conversations with the senior participants were often difficult, but as time went by, I became better at understanding them. Further impediments to progress came in the form of misunderstandings leading to degrees of interpersonal conflict, all arising out of my own inexperience with and ignorance of the cultural mores.

One essential difference between the Southern community and the traditional-based communities is that the Southern Community no longer has a Traditional Owner who identifies with a recognised ‘Country’. This was both enabling and restraining. Instead, there were several families who shared a collective and understood ownership. This situation complicated the task of collecting the traditional knowledge and introduced some interesting social and Community dynamics, given that there were petty jealousies and debate over who knew what and who had cultural precedence over the others.

4.13.2 Enabler/Restrainer Cases within the Community

I found enablers and restrainers to be either physical or non-physical in context. The physical related to access, either to the Community itself or access to facilities within it. Access to the community was determined by the weather. The non-physical aspects related to those face-to-face social interactions that were, what I term, either ‘uplifters’ or ‘downers’, and were generally unforeseen. Furthermore, every one of these experiences served as a

significant lesson for me to learn. The enabling events were definitely reinforcing and indicated I was on the right track with fitting in, observing protocols, following behavioural norms and just doing things the proper way. The restrainers, on the other hand, indicated I had either not observed protocols, or had not been careful enough with what I had said. But then some of the social situations I found myself in were very difficult to read into, particularly those with a significant cultural loading.

Table 4.12 Enabler/Restrainer Categories

Enabler	Top End	Centre	South	**Restrainer**	Top End	Centre	South
Site Visits	11[1]	1	6	Protocol breach	3	4	4
Meetings	36	10	19	Exclusion zone change	0	1	0
New Contact	7	3	4	Logistical / practical	1	1	0
Keeping TO in loop	12	2	7	Negative attitude	0	0	2
Intermediary	5	1	3	Financial	0	3	2
Positive Verbal Feedback	25	1	19	Family Adverse Connection	1	1	0
Family-Community Assist	31	1	20	Health impacted work	1	0	4
Gifting	10	2	3	Community Conflict	0	0	4
Facilitator-Liaison	2	3	10	Community leadership	1	0	0
Trad. Knowledge Extension	5	6	4	Misunderstanding	0	0	1
Improved work relation	3	3	13	Staff turnover	2	0	0
Sharing concern	5	2	24	Site access problematic	1	0	0
Family Social interaction	11	12	30	TO/Elder access	1	0	5
Community facility access	7	7	7	Billeting	3	2	0
[1]Frequency count.							

Table 4.12 relates directly to my analytical memos (Saldaña, 2012), brief notes about my thoughts, and ideas that came to mind during my data gathering, coding, and analysis. The category terms chosen reflect the general nature and context of those associated events. The enabling and inhibiting situations indicated in Table 4.12 are a representative cross-sectional sample, covering all three Communities. They have been analysed for on a 'first sweep' basis, a combination of the situational context aided by my memory. The enabling situations were often accompanied by positive feelings that ranged from pure elation to 'sigh of relief' moments. On the other hand, the inhibiting situations were associated with feelings

of despair, frustration and anxiety. Often these situations arose without any prior warning and often they were a measure of my naiveté and cultural inexperience. Other occasions simply arose from self being already immersed as an insider, where I was caught up in the middle of messy factional, inter-family Community disputes.

Table 4.12 shows that site visits, meetings, keeping Traditional Owners and Aboriginal Elders in the loop, receiving positive feedback, and family social interactions were all powerful sources of enabling behaviours. The family and Community assistance events were often key to resolving a major hurdle that had cropped up. Sometimes this was done through my facilitator–liaison's intervention, or other members of a family who had witnessed my difficulties, offering advice on how to get around the problem, and sometimes talking to a third party behind the scenes. The examples shown below, with dates given for the entry, are not exhaustive, but serve merely to provide the reader with an overall perspective.

4.13.3 Enabler Samples

Facilitator–liaison – Centre: facilitator–liaison liaised with senior men pointing out possible useful cultural providers, worded up the senior men about my work benefitting their kids (4 Oct 95).

Sharing concern – Top End: Receiving indications of trust and acceptance during discussion when personal views and sensitive information is shared (17 Apr 96).

Positive verbal feedback – Southern: Revealing meeting with senior man who indicated personal worries about white Gubbahs coming and taking culture for inappropriate use (7 Jun 96).

Family-social-interaction – Top-End: The social club was a good location for catching up with participants, getting to know people on a family personal level. Also, opportunity to make meeting arrangements for later in trip. Participants were more relaxed, spoke more openly (3 July 1996).

Family/Community assistance – Southern: Being referred to an extended family member to help resolve dilemma was a delight plus the additional affection. A clear indication of Community's perception of value of my work (27 Sep 96).

Gifting – Top End: Gifting senior people/family members as matter of course, meeting my obligations by 'loaning' money to other key participants. All part of the understood family social protocols and expectations (25–26 Feb 97).

4.13.4 Restrainer Samples

Negative Attitude – Southern: Meeting with Aboriginal Elder, receiving negative critical response to idea of work. Opposition driven by previous poor experience with academic taking cultural knowledge from Community (10 Jun 94).

Protocols – Centre: Learning avoidance practise after asking an inappropriate sensitive question and being ticked off. Received reprimand/admonishment (4 Oct 95).

Finances – Centre: In the Centre community, payment for service was understood as an accepted and necessary part of the sharing of traditional knowledge. Most key participants expected payment. In some cases, this posed a problem with personal cashflow situation (24 Jun 97).

Community conflict – Southern: A very difficult spontaneous meeting with heated words spoken, but with a breakthrough and possible resolution towards the end of

conversation. Self is appointed to an intermediary role between the senior culture man and co-operative administration (26 Sep 97).

4.14 Conclusion

My findings provide a series of interconnected episodes that are largely reflective of my face-to-face conversational interactions with my Aboriginal participants, within the three diverse Aboriginal Communities and their associated Country. These conversations formed in part my enculturation journey and were a vital component of my learning to live as Community insider and extended family member.

The analysis helped me to identify the team cell locations and members, which were grounded in Community operations, each location identifiable with tasks and outcomes key to the eventual success of the bookwork. The final stage of the analysis was uncovering and defining the essential role played by how I engaged verbally with the Others, how I was talking to the individual participants, uncovering the very nature of those conversations between Self and the Others, and then to find that each Community location had its own range of types of talking. I have referred to these talk types as Social, Family, Collaborative, Project, Revealing, Cross-cultural and Collegial. These ways of talking, reflecting different ways of knowing, weft and weaved together the social networking fabric embracing my interpersonal relationships with my fellow workers. The big surprise among these talk types was the presence of the Collegial talking – conversations that surpassed all others in terms of conceptual and intellectual content, and which demonstrated aspects of co-ownership. The Collegial talks identified an ability to announce the book's future potential for reconciliation, bringing 'black and white all together under the one umbrella'.

Finally, entwined with all of these social constructs were the enablers and restrainers – identifiable, evocative elements in time that paint a humanistic and emotive shade over the

Community landscape. Permeating throughout my findings has been my overwhelming sense of privilege, and gratitude to have worked alongside my Aboriginal participants, for the opportunities they provided me, time and again, where I was taught so much by these wonderful people, my friends. My original book project was about a two-way view of the earth sciences, and so, it seems appropriate to lend an Earth perspective to this conclusion. The Communities provided the 'gardens' to germinate and grow that crazy idea I had about a two-way science textbook. The work that I and my Aboriginal friends did together provide the nourishment and nurturing that eventually saw the book's fruition.

In the next chapter, I discuss these findings, positioning some findings in the broad research field and highlighting those aspects that could have been anticipated in my analysis but were not found, then finally I present my innovative contributions theoretically to show how these analyses have led to new knowledge.

5. Chapter Five

Extract from diary

Wednesday 27 September 1995 – Meeting with Jack

Location: Shelter, opposite home, High Camp:

When I approached the home, Jack's wife was outside, and I parked, stopped the motor, didn't say anything but his wife Dolly, in her usual fairly gruff, blunt sort of way, said, 'Wait, he'll be out in a minute'. She had obviously been talking to Jack.

So, I waited for about 10–15 minutes, when Jack appeared, walking fairly quietly and fairly slowly. I got out of the car and say 'Good day'. I get the materials out of the back of the car, put them on the bonnet and said that these were the materials that I wanted to show him. Jack said, 'We will go across to the shelter'. I drove around to the shelter and he walked across. Over there I set up the photographic displays out on the ground, set them up for him and Jack sort of just stood there, looking at the materials and he remained standing while I flicked through the pages showing all the Top-End stuff, and all the Dreaming stuff, and he was getting closer and closer. It was obvious he was getting more and more interested in it.

When I showed him the Ancestral Being rock, with Aunty Penny and Danny standing by, he actually got down closer and I was explaining the connection between the Earth Science and the local culture, and so on.

When I actually got on to the pages, actually detailing, first of all the Centre Community area, he was even more interested, and I explained

how I was going to introduce the modern technology homes, and whatever, to introduce a physical science approach, and explained that we still had a long way to go with developing the culture there, and that I would be doing that next week. Then I got into the culture from the Southern Community, and Jack got very interested then, particularly when I started explaining in terms of the fish traps and pointing to the pictures showing where they were dug and he was obviously, from his comments, really quite interested in that. And his whole manner changed, livelier and more enthusiastic I guess, and when I pointed out the little figure of Darcy, he really got involved with it then, and I could see that there was an obvious linking and connecting with the Southern people, which I thought was tremendous.

I put out the promotional materials at this stage and he actually sat down cross-legged in the normal way, and he's got the stuff in his lap and the first page I gave him was the one where his story is written down, and its transcription of his narrative. I really didn't know what to make of it for quite a while, because for about ten minutes he read through it, and read through it, and he's obviously cogitating, and in the end to sort of break the silence, I said, 'What do you think of it, how is it?' He said, 'Oh, it's good'. I then said that, 'I hadn't changed it any, and it's how you said it and it's how the kids would want to read it, and they would understand you, and how you say things and how you would express the story'. I asked if there was any way in which I could improve it and he said 'Yes', there was a word, and he pointed to one of the words which needed to be corrected and I then apologised for not having a pen, which was a bit

ridiculous, but he got up pretty quickly and walked across to his home and got a pen.

He eventually came back over, sat down and mulled over this word that he wanted to correct and he spelt the word out to me, and I actually wrote the word down. I then turned to the next sheet, which was the sheet with the aerial photo, and he really was interested in that. Before that I went over the idea of developing the science work with the ochre rocks which is on the same sheet as his story, and he could see the connection then between geology, minerals, chemistry and culture.

With the aerial photo, I showed him that and he looked at it, and I'm not too sure how it came about but he was looking for the ridge. I was not sure about the ridge where the [ancestral beings] went up and over, up across the ridge and down the other side, and I've got to try and get the name for that and … but he put the ridge in another place. He didn't seem to think it was on the road that goes out to the airport, but so anyway I've circled that. Also, the question arose where the two water holes are, the two water holes where the [ancestral being] stopped and met the white crane. That's something else that we've got to get to do. He's going to take me to them. I'll get some diagrams done of those because they would be excellent to put in with the story, interspersed with the story because they would be excellent for the kids to connect with the story, and parts of the landscape as we go through the story.

We then went quickly through the next two sheets which were detailing Aunty Penny and Danny, and he was interested in that, with the rock, and

the one around at the [rock art hill], the one showing the fish and weathering and the erosion and he could see the connection there with the culture, and then he finished up with the sheets on the Southern Community area, and looking at the stone homes. He was really quite interested in those and he thought it would be good to draw a stone home as it was in the old days, and he was very interested in the fish traps, and the idea of having a computer-drawn graphic, with a series of diagrams showing the lake progressively flooding and activating the fish traps. I think it was about at this stage that he mentioned that they have fish traps up here and use them at the end of the wet season.

They are located [in a] valley, where his outstation is. When the flood waters are down and when it is knee deep, they get wooden pegs and put them at various stages across the river and get branches and leaves and they float them down against the pegs and the force of the water compacts the leaves, twigs and small branches into a mesh and of a night they hear the bream and the barramundi and the perch come down. There is a lot of splashing and that's when they trap the fish. He said he would construct this trap for me. He said it takes about an hour and a half, and they would then get all the fish out. Of course, they wouldn't be able to show me the fish, but yes it would okay for me to go out and take photos of the trap, and he could see the connection between the fish traps up here and those down on the Southern region, constructed by the old people long ago. He said that the end of the wet season, March–April, would be a good time when, when I visit again next Easter. That would be the time to go out and see it, as June-July would be too late.

He gave me the best ways to get in touch with him, through the Northern Land Council, followed by the Community council itself. Just some general comments, Jack was really very impressed generally. He said that the materials are already very rich (in culture), and understands that the materials are only at an interim stage, gathering ideas and suggestions from people, but he likes the way it is going. He really was very interested in all of the work especially that from the southern part of Australia. He finished by saying to give his regards to Darcy and all them mob down there in Southern Community. I mentioned that Darcy was the local education consultant, and that he wasn't an Elder yet, but that Aunty Lily and Aunty Polly were helping me with the stories.

Jack is a bit difficult to pin down, but when you do, and he has got the time, he is of absolutely fantastic value. You get that earnest and sincere input. He is able to comment quite critically from both worldviews, and as Peter Carroll has said, he is one of the few Aborigines in this region that has his feet firmly planted in both worlds. Simply from that perspective he is of excellent value in terms of feedback and critical analysis on how the work is developing and I appreciate his output very much so. During the discussion, Jack reiterated the idea that this school work will help retain the kids' culture and I guess a classic example of that was the rock diagrams of the fish and I mentioned that I was going to try and put these in the unit, alongside actual photos of the fish, so that the kids could see from both worlds how the fish are represented, and with some notes on the fish and so on. He understands that I need to keep coming back and seek his advice and the others too, to ensure the accuracy and detail of the

cultural content, and that I am getting everything right, and he agrees with that. He's more than happy to give his time because it was for the kids but he also said it was for the Balanda kids, which I think shows real wisdom because both sets of kids will benefit from this cross-cultural stuff.

This lengthy extract describes my first in-depth meeting with Jack where we had the chance to closely review the evolving drafts of the book. The meeting was an absolute revelation, an epiphany, an uplifting moment, accompanied by this sudden realisation that the bookwork was now acknowledged as serious stuff. It was for me valuable affirmation that I was on the right track and doing good work. Jack's words and actions were a strong endorsement of my efforts, and it was of much comfort to me. He was reinforcing once again the importance of this two-way approach to science education, and its importance for both 'black' and 'white' people. Jack and I had together taken a major step, one which I remember clearly to this day. Our co-created 'garden' of knowledge was flourishing, the rhizomes were vigorously working their pedagogical magic and Jack, as head-gardener, was happy. And oh boy, so was I!

5.1 Introduction

This chapter progressively provides answers that are integral to the main research question, 'What has been the role of professional conversations in the mobilisation of Aboriginal knowledge from Country to Classroom?'

I should start by reiterating for the reader that the diary entries and filed notes upon which this study is based were never intended for anything other than to provide me with a reminder about previous fieldwork trips and associated experiences with the aim of doing better next time. 'Better next time' translates to getting more work done, making less of a fool of myself, and forever improving on 'doing things the proper way'.

Therefore, being able to write a Chapter Five for this study is a bonus and has been a case of adopting and applying a best-fit policy in relation to current and relevant academic research findings. And in this regard, Chapter Five has proved to be little different to the rest of this inductive study. It appears the background for this research study and underlying processes appear to guarantee a non-alignment, and mutually exclusive status in relation to other research in the education field. Research that is relevant to a combination of developing a secondary science curriculum, collecting and recording Indigenous traditional knowledge, and observing the accompanying Indigenous Community engagement seems to be an outlier in terms of the academic research. Research that covers these three activities being conducted simultaneously appears, to the best of my knowledge, to be non-existent.

This chapter will be an attempt at adopting Yarning as a virtual framework for describing and explaining, retrospectively, social interactions and related events, occurring twenty to thirty years ago. I am attempting to provide for the reader an image of, and some measure of explanation for, the social dynamics surrounding the Yarning that occurred within the Aboriginal Community and on Country.

5.2 My Findings Confirmed by the Literature

5.2.1 Contact Zone and Third Space

Extract from field notes, 27 September 1996:

> *Went to the club at about 7.15pm – waited quite a bit before speaking to Jack, very careful not to be rude or pushy. Jack has that regal and aloof air sometimes and I'm always trying to read his body language. He is sitting with Rex this evening. Eventually he'll pause and make eye contact and indicates for me to engage in conversation. Eventually have a good chat with both men. … Dolly arrived towards 8.00pm and gives me a kiss,*

referring to me as brother-in-law. Dolly has obviously been drinking, she's not normally this outgoing, but her sentiments seem genuine enough. Jack said it was okay to meet with him tomorrow morning – any time he said. This is a marked turn around as he been very protective of his time, his family time, over the weekends. My involvement with the project has up until now been associated with his work, one of the many different things that he advises on, is consulted on or is expected to adjudicate over because of his high standing in the community. It does appear that I have the stamp of approval, and am now seen as part of the extended family. Jack speaks very highly of the project work, and its importance in the education of the Community's kids. Also, it's important for the 'white' kids to learn about the culture. Jack confided in me on two matters – he once taught Rex at the Community School and also taught Dolly, his second wife.

Speaking academically

The literature reveals a perceived connect between both the Contact Zone and the Third Space to Yarning (Power, 2004; Somerville & Perkins, 2010; Taylor et al., 2014; Thorpe et al., 2021).

Power (2004), positioned as both insider and an outsider, heard and understood the voices of her Aboriginal participants. Tjitayi and Osborne (2014, pp. 23–32) write that

> embodying a third space that reflects both Aboriginal and non-Aboriginal ways of teaching, learning, knowing and being, we create a pedagogy of place where we can teach with 'place' in mind. The third space becomes a pedagogy of strength where Aboriginal and non-Aboriginal worldviews

come together and seek to disrupt the discourse of disadvantage, and the assumption that the 'white way is the right way'.

Furthermore, Johnston (2013, p. 18) reports on the 'Third Space' as a reconciliation tool, 'Interviews with students and Aboriginal participants … confirm its function as a third space that contributes to reconciliation'.

There is very little material in the research literature that reports in any detail procedures for initiating community contact in instances where there has been no prior contact. Most research, such as the healthcare and early childhood fields, comes on the back of a pre-existing, well-established community-based agency. One example given by Rumbold and Cunningham (2008, p. 83) aims 'to review evaluations of changes to services or changes in the delivery of antenatal care for Australian Indigenous women and the impact on utilisation and quality of care, birth outcomes and maternal views about care'.

A final aspect to the third space and contact zone, relevant to this study, relates to social attachment and acceptance. A relatively early application of Yarning research within a Community context was the 'Yarning Up' Model operated as a program instituted by Victoria's DHS (Coade & McLung, 2008). The program, which focused on effective engagement with troubled Aboriginal youth and their families, provides interesting and familiar parallels to the original Community-based fieldwork underlying this study. The model highlights the importance of yarning in terms of 'attachment', which is viewed by Becker-Weidman (2005, p. 7) as 'a general term that describes the state and quality of an individual's emotional ties to another'.

The 'Yarning Up' model emphasises the difference between a Western context and the Aboriginal, where attachment has a more collectivist base. Aboriginal Communities represent collectivist cultures where people are more likely to think of themselves in terms of

their connection with other people and their community. Agishtein and Brumbaugh (2013, p. 398) observed that 'collectivism was positively related to attachment anxiety' and refer to where '…individuals who have successfully integrated into their new culture may feel more accepted and thus less anxious'. Similarly, Wang & Mallinckrodt (2006) propose that the ability to explore novel environments which is provided by the secure base of an attachment figure may enable individuals to acculturate more readily to new societies. In other words, people who were more invested in their in-group tended to be more dependent on the Others and more fearful of rejection.

Speaking as self

The analysis for this study indicated numerous Collaborative and Collegial type Yarnings with Darcy and Aunty Lily and several others at the Co-operative in the Southern Community, Yarnings that also focused on this tri-elemental Third Space approach, suggesting a two-way path to teaching science. Johnston's (2013) observations reaffirm the philosophy and ideals behind my original Community work and mirror the Collegial Yarnings held with Jack and Annie from the Top-End Community, both of whom described the reconciliatory nature of the work with 'black' and 'white' all working together under the one umbrella'. As Jack from the Top-End explained, the Balanda students need to learn about Bininj culture, because 'They are the ones more likely to become tomorrow's lawyers and politicians'.

Once I became attached and accepted, the community connectedness provided me with the security, confidence and motivation to pursue the bookwork project. I mattered to them, and they to me. Of course, the connection to this study was the Yarning which took place within these collectivist Community cultures. And two specific conceptual frameworks that highlighted aspects of the work – how Self operated and engaged with the Others – were

the ‘third space’ and the ‘contact zone’. I had extended family members in all three Communities who were looking out for me, offering active support, taking note of my movements and expressing ongoing interest in the work I was doing. But the initial, ‘getting-to-know-you’ period was a worry, in terms of collectivism and adult acceptance. I have previously reported on how I realised with relief the increasing acceptance of my working cells in each Community, particularly the Top-Enders and Southerners.

5.2.2 Researcher Embeddedness

Speaking academically

In terms of embedded research, Guerin et al. (2018, p. 86) observed that

> The participants are engaged in a stronger social relationship than for the previous conversational research, involving more personal involvement to the point of an acquaintanceship or friendship. …You as a researcher become ‘embedded’ in their life for a short period (weeks or months), the researcher and Community can build (together) a broad contextual view of their life as well as the specific issues being researched, and to make iterative checks with them about what you are documenting and how you are thinking about it. … you spend serious amounts of time with them compared to current research methods; the talking is informal, non-interrogative, conversational, chatty, and ‘talking around’ the topics just like a normal conversation with a friend in fact.

Furthermore, in terms of their embedded research, (Vindrola-Padros et al., 2017, p. 70) found that ‘the research is therefore produced through a collaborative and participative process, and it is jointly “owned”’.

Speaking as self

Reading this passage is like holding a mirror up to my fieldwork. It reflects actual 'feet on the ground' working experience, 'walking the talk' in Aboriginal Communities. The duration of 'embeddedness', in my case, spanned years.

When reflecting on the precursor to this study – the Community book project – I see significant consistency with Guerin et al.'s (2018) definition, particularly when considering the collaborative and participatory manner in which I engaged with my Aboriginal participants. If I view my Aboriginal team as co-working staff members, then it is reasonable to interpret Yarning as a data collection method for this current research context. The evidentiary links between my original project work and the Aboriginal Communities' collaborative nature and ownership provide substantial parallels to Vindrola-Padros et al.'s (2017) study.

In conclusion, I am comfortable describing my research as 'embedded' Aboriginal research, particularly concerning the use of Yarning as a method.

5.2.3 Yarning as Method and Pedagogy

Speaking academically

Yarning as a method figures significantly in the current and emerging literature. Dean (2010, p. 6) informs us that 'Indigenous communities have utilised Yarning as a workable method to share, explore and learn for many previous generations and will continue to do so'. Within an Aboriginal context, Yarning has many layers (Barlo et al., 2020; Bessarab, 2012; Bessarab & Ng'andu, 2010; Dean, 2010).

As a research process, Aboriginal Yarning deformalises the researcher identity and demands a state of equity for the human-to-human interaction, where both researcher and participant are knowers and learners in the process (Bessarab & Ng'andu, 2010). Bessarab &

Ng'andu (2010, p. 38) suggest further that rather than interrogating, measuring or extracting Indigenous knowledge/experiences, 'Yarning is a two-way approach that builds on the notion of reciprocal knowledge exchange between the researcher and the researched'.

Stuart and Shay's (2019, p. 194), highlighting the position of Yarning as a research approach, comment that

> As a people that lived sustainably in harsh environments for tens of thousands of years, there is much to learn from Indigenous knowledge systems and indeed in how the knowing occurs. Modern adaptations of Indigenous Knowledges in research methodologies such as Yarning (Bessarab, 2008) must not be dismissed or seen as less rigorous than other social science methods.

Nevertheless, while the use of Yarning as a research method is well documented (Atkinson, 2021; Bessarab & Ng'andu, 2010; Rheault, 2021; Shay, 2019), it is still comparatively new, and the literature points to inconsistencies with approaches taken and terminology used for Yarning-based research (Carlin et al., 2019). Descriptions of the application of Yarning are diverse, indicating the method is an emerging field that requires more research (Atkinson et al., 2021; Shay, 2019).

The use of thematic analysis for this study also accords well with the literature. Rheault et al. (2021, p. 12) thematically analysed their data, coding the transcripts line-by-line then clustering similar codes into emergent conceptual categories, which were then structured and grouped to form overarching themes, 'All the sources of data – field notes, transcriptions, and case studies – were interrogated in a qualitative way to identify the emerging themes'. Dale et al. (2021) similarly collected their data through '… a synthesis of Indigenous qualitative methods (research topic and Social Yarning) with Western qualitative

and quantitative methods (participant surveys, observations and field notes)'. Their data was analysed using thematic analysis.

The literature also directly connects Aboriginal Yarning to pedagogy. As Leeson et al. (2016) state, 'Yarning constitutes an established approach to Aboriginal and Torres Strait Islander pedagogy' (Bessarab & Ng'andu, 2010; Martin, 2008 as cited in Leeson et al. 2016, p. 8). Power et al. (2018, p. 154) report on the 'Australian Aboriginal cultural competence that allows the inclusion of Aboriginal perspectives and learning techniques…' through a pedagogical framework that '…focused on strengthening identity, achieving success, and transforming lives'. Recent research by Harrison and Skrebneva (2020, 15) connects pedagogy to Country. Their article explores culturally responsive pedagogy (CRP), which they claim '…has become a driving force for change in North America and New Zealand and is gaining some recognition in Indigenous education in Australia'. They recognise that 'Teacher understandings of the students' cultures are widely accepted as being fundamental to the achievement of effective schooling outcomes'. Their article recognises the importance to being on Country to receive cultural awareness and immersion training. Interestingly however, while Harrison and Skrebneva (2020, p. 179) recognise that 'As a pedagogical concept, Country is positioned as an engaging medium for teaching all students about Aboriginal and Torres Strait Islander people', they do not mention Yarning at all – despite referring to an Aboriginal aunty teaching students a sense of belonging to Country

Speaking as self

I was initially reluctant to use the term Yarning to represent verbal communication, given that I had only used the term once in all of the 60,000 words comprising the data body. Plus, I had to put aside my conservative, formal report writing style and focus on a more informal, relaxed approach to my writing and thinking. I had to acknowledge that the extent

and significance of my conversational engagement with my Aboriginal participants and colleagues had become evident during the early stages of my analysis.

It was indeed a 'Blind Freddy'[8] moment. It became apparent that the use of the term '*Talking*' for expressing the whole story, with all its cultural overlays, was inadequate and did not do justice to the narrative or situational context.

Added to this was the growing awareness of just how much my Aboriginal participants had taught me. Underlying all the Yarning, there was a lot of teaching and learning taking place. Often, I would listen and watch because I learnt a lot through observing gestures, facial expressions, and body language like hand signs as I looked for signs of approval and acknowledgement, which usually were not stated. In the early stages, I lacked confidence, never sure of how to respond, what to say. When we were 'on the job' developing ideas and content for the book, like when out on Country, I would follow them, always seeking a greater understanding and asking questions when appropriate. We would exchange ideas about how to best represent their traditional knowledge as cultural content during our review and feedback sessions. I was also conscious when communicating and felt the need to stress how important it was for their Traditional Knowledge to be taught, alongside Western science, to the students.

It was always a two-way interaction. My diaries and field notes reflect Faulkhead and Thorpe's (2016, p. 5) comment, 'Yarning implicitly acknowledges the various contributors, embraces their contributions. It is by nature co-creative'.

Table 5.1 shows the number of individual talks conducted with the participants in each Community. I have included the conversation data with non-Aboriginal participants, not

[8] An informal Australian expression for an imaginary person who has little or no perception.

just as a comparison, but to show the varying but necessary non-Aboriginal ancillary support required during each field trip.

Table 5.1 Face-to-face Yarning with Community Participants

Community	**Days**	**Aboriginal Participants**	**Non-Aboriginal Participants**	**Face-to-Face Yarning**	
				Aboriginal	Non-Aboriginal
Top-End	[68][1]	23	12	197[2]	82
Centre	[55]	21	25	87	90
Southern	[172]	38	9	303	69

[1]Days in Community
[2]Frequency

The frequency and context linked to my conversations with the Aboriginal participants strongly suggested Yarning as the preferred term. It has focused the analysis and discussion through an Aboriginal lens. Some interesting trends are indicated in the results above, such as engagement with non-Aboriginal participants decreasing with increasing Westernisation of the Community, while engagement with Aboriginal participants correspondingly increased.

At this latter stage of my study, it has become self-evident that Yarning provides me with a culturally appropriate, relational framework to sensitively compare three Community-based elements: the participant, the Yarning type, and Community location. This contextual framework, I find, has enabled me to analyse and discuss this study's findings of how, where and why I talked to my Aboriginal participants – one that seems readymade to convey the insider's social, cultural, Community and Country perspectives. Besides, Yarning provided me with the scope, depth and versatility to answer my main research question, 'What has been the role of professional conversations in the mobilisation of Aboriginal knowledge from Country to Classroom?'. This socially interactive Community dynamic, as far as I can determine, has not been researched before.

The emerging academic discussions centred around Yarning as both method and methodology provide only a peripheral link to this study, because these conceptual constructs in combination, serve no useful purpose in developing my autoethnographic journey. They provide no scope for my exploration of all the conversational engagements with my Aboriginal participants and colleagues. In the following section, I explore how I was pedagogically engaged with and within the Communities. In brief, the Yarnings with my Aboriginal participant members involved two-way learning and teaching in almost every instance, mostly informal and incidental to the main purpose of the event. Often, these lessons I learnt were subtle, and underscored the gentleness, patience and acceptance of my Aboriginal friends.

5.2.4 Yarning – within a Pedagogical Context

Speaking academically

While many definitions of 'story' can be found in the literature, two of them from the Macquarie Dictionary provide definitions that appear relevant to this study. In standard English, a 'story' is

> A narrative, either true or fictitious, in prose or verse, designed to interest, instruct, or amuse the hearer or reader;
>
> a tale;
>
> a narration of a series of events, or a series of events that are or may be narrated;
>
> a narration of the events in the life of a person or the existence of a thing, or such events as a subject for narration.

And, from an Aboriginal English perspective, a ‘story’ is ‘an account of one aspect of the Dreaming which touches on fundamental elements which should guide the individual and society’.

Andrews et al. (2010, p. 3) state that ‘there is not a large theoretical foundation or empirical evidence about the storytelling technique. As have teachers and instructors for thousands of years, we know that storytelling is a very effective instructional method’.

Placing this in an Australian Aboriginal context, Gannon (2017, p. 8) refers to the storytelling imperative through a methodology of Yarning, talking back and forth between non-Indigenous and Indigenous participants. He argues for an ‘artful autoethnography’ connected to ritual, promoting connectedness and liberation through aesthetic and artistic practice, co-construction and processual knowledge-making, all with the Community rather than apart from it.

In the context of NSW’s 8 Ways framework, Power et al. (2018) found that learning in a formal context can act as a transformative experience in intercultural settings and as a powerful pedagogical tool in the Aboriginal Community. At a more informal and traditional instructional level, McNair et al. (2012) report on the role of Elders from a pedagogical context within the Community. McNair et al. (2012, p. 20) found that the position of Elders in education is critical for sustainability of relationships, culture and land, and the Community’s and family’s roles and pedagogy continue in school education when teachers and educators have the relationships, trust and respect of the Community and learners. Recently Hansen et al. (2020, p. 1) link Aboriginal pedagogy directly to Yarning. Their article refers to a cultural awareness training program, co-created by Aboriginal and non-Aboriginal academics, used to embed Indigenous pedagogy through Yarning and oral

storying. Their aim was to produce transformative learning outcomes that also met key national, local and professional directives.

Speaking as self

These references to pedagogy reinforce what I experienced and observed during my frequent journeys to Community and Country over a long period of time. The learning I received, as part of my cultural immersion, was an ongoing and inherent aspect of each field trip. Much of my learning was by association, respectfully observing family members during social events. My quest was to fit in, to the extent of acquiring, over time, the Aboriginal English vernacular. I was pretty chuffed when one of the Aunties informed me of my success. My focus was on blending in, reducing my 'white' profile to a minimum.

I am forever mindful when monitoring my progress, against the literature guidelines (Bochner, 2001; Ellis, 2004, p. 126) when judging this autoethnographic study for its accuracy and usefulness for the wider community. By adapting the Guattarian concept for rhizomatic learning, I am also mindful of my learning process throughout this study whereby my data, my memories and reflexive thinking have all grown out of the original Aboriginal pedagogically based learning I received in the Aboriginal Communities, those garden beds that nurtured and nourished the germ of an idea about two-way Earth Science. As I complete this study I contemplate just where and how far the rhizomatic pedagogical processes will spread this dual worldview idea.

Saturday 7 June 1997 – Top-End Field Notes

9.15-10.15am: Met with Jack, Rex, Danny and two other men (relatives of Jack). Went through the material and discussed the preliminary drafts. There was much animated discussion in lingo and a lot of interest. And the general impression and opinion given was very positive. The Elders were

very surprised, especially Rex, about the level of depth of culture at the Centre Community, especially that they were Bush Aborigines not that long ago. They said that some of their recently passed away relatives still had the peg holes through their noses. The 'Old Man' dreaming particularly took them. Jack mentioned two additional cultural aspects that could be included, so we went out to perch rock and Long Tom rock. Passed Kevin while driving back, Jack had a short discussion in lingo about Kev's recent trip to Sydney. Jack chuckled after Kevin went on his way, and exclaimed that Kev's language ability was very good, a nice change for a Balanda to speak it so well.

This important get-together was conducted out in the open and highlighted another key step in the book's development journey. It was for me a game-changer, a very powerful acknowledgement and endorsement of what I had been struggling with for ages. My worry had been the extent to which one Community's traditional knowledge was accepted by another, and that fear was now was resolved. Approval was confirmed. This meeting of minds, Aboriginal and non-Aboriginal, presented a powerful two-way teaching and learning event and it was a first. Pure Aboriginal pedagogy in action, the first occasion where these influential Community men had seen the book draft work together, and there I was, actually learning and teaching along with them as a team, involved through the mutual rhizomatic learning that connected all three Communities. One Community nourishing and nurturing the culture in another. The pedagogical rhizomes were flourishing with real synthesising and synergising effect, a virtual symbiotic event evidenced by the serendipitous entry of yet another wonderful piece of traditional knowledge, which further added to the glorious common garden of knowledge growing in all three Communities.

5.2.5 Yarning, Location and Posting

A significant volume of research connects Yarning to place (Barlo, 2020; Osmond & Phillips, 2019; Somerville & Perkins, 2010), where place is interpreted mainly within a situational social context, such as social positioning, cultural suitability and participant safety.

Hill and Mills (2013, p. 76) emphasise the importance of 'place' or location in relation to storytelling and yarning. Location could not be ignored when a story was told, 'Place rather than time emerged as the crucial element in developing an understanding of Indigenous cultural competence'.

The most common locational link to Yarning is by the generalised 'Yarning circle' (Barlo, 2021, 2017; Coombes et al., 2018; Dale et al., 2021), but the attached connotation is not just to the physicality of location, but also the technique.

Yarning circles, in the main, are contrived social structures adopted as research methods for collecting data from Aboriginal participants, often through formal, structured, and semi-formal interviews. (Fleming et al. 2019). A recent development, an 'on-line' version, using web-conferencing is reported by Anderson et al. (2021).

Ristevski et al. (2020, p. 126) do obliquely refer to different community locations by reporting that 'The Yarning circles were facilitated by an Aboriginal Elder known and respected by the Community, held in different locations in community facilities, were conducted over 2 hours, were audio-recorded and transcribed verbatim'. Ristevski et al. (2020), however, provide no further details about the location. In my research analysis, I found that Community and Country locations connect to how we Yarn to our Aboriginal research participants. Section 5.5.5 provides some introductory details for this Yarning to location connection.

The academic literature also refers to researcher positionality (Atkinson et al., 2021; Dean, 2010), but the context here is the social framework encompassing Self and Other. Furthermore, Atkinson et al. (2021, p. 3) clarify and conditionally accept researcher positionality in the context of shaping data interpretation by contrasting it with Yarning research's relationality with family, Country, community and cosmos. So, here we have a direct reference to a physical place, locating Yarning within Community and Country.

The attachment theory lens provides an extra dimension to investigating positioning within the community context (Coade & Clung, 2008).

As developed by Bowlby (1969, 1973, 1980), attachment theory is a way to account for '…the emotional bonds that form between individuals…' (Sable, 1992, p. 271). A growing body of research focuses on attachment relationships during adulthood, as evidenced by Hans (2005, p. 566), and my analysis indicated elements of this theory operating within the social support networks in my fieldwork's 'maintaining' stage. I found that both 'attachment' and 'acceptance' were synonymous, working as combined threads to the 'insider' social fabric.

5.2.6 Yarning Types

Speaking academically

This study's findings, in relation to Yarning types, appear to be substantially confirmed by the post-Chapter-Two literature research. Six of the Yarning categories observed during the analysis approximate to those provided by Bessarab and Ng'andu (2010) and Walker et al. (2014). Bessarab and Ng'andu identified four different types of Yarning, which they term social, research topic, collaborative and therapeutic. Walker et al. (2014) identified a further two types of Yarning: Family and Cross-cultural. Collectively, their research has established a defining baseline for identifying and categorising Yarning types

This study's analysis has identified seven categories of Yarning, the first six of which approximate to those defined by Bessarab and Ng'andu (2010) and Walker et al. (2014), are tagged as: Social, Family, Collaborative, Cross-cultural, Project, and Revealing. The additional, seventh yarning type identified in this study is termed as Collegial. In this section, a comparison is provided between this study's Yarning categories against those recorded for Yarning in the literature. The definitions for the Yarning types, given in Table 5.2, are necessarily abridged.

Table 5.2 Definitions of Yarn Types

Definition of Yarning types from the literature[1]		**Definition of Yarning types adopted for this study**	
Yarning type	Definition	Yarning type	Definition
Social	This Yarn occurs between the researcher and participant before the research or topic Yarn; trust is developed, and a relationship built.[2] Social Yarn topics can be diverse and include whatever social information the participant and researcher share in the moment.[2]	Social	Social Yarning was the initiator for any conversation but sometimes formed the whole Yarn, especially with someone new. Social Yarning was used to break the ice, relax and transfer to the next stage of Yarning. Furthermore, Social Yarning could re-enter as a bridge between other Yarning types in more extended conversations, just as a bit of 'time out'. It was used more in social spaces and was an excellent way to hear gossip and get community news updates.
Family	Family Yarning represents Aboriginal and Torres Strait Islander peoples' connections and relationships concerning land, spirituality and kinship and is utilised to learn about relationality to one another.[3] It is often used in combination with the Social Yarn.	Family	The Family Yarning was often associated with places of relaxation with a family context, typically the home and social club, but also during drives to and from the cultural sites. Once the Traditional Owner or Elder had relaxed and the day's business had been attended to, we would lapse into Yarning about recent family happenings, including kinship and ceremonial-related stuff. Often, I would learn about other family members and new contacts for help.
Collab-orative	The Yarn is focused upon research processes.[2] Cases include designing Yarning topics, identifying researcher priorities and projects, and analysing data.[4 2 5 6] When used to analyse data, Collaborative yarning can provide enhanced opportunities to explore and explain concepts, resulting in new understandings about the research topic.[2]	Collab-orative	The Collaborative Yarning involved all arrangements in preparation for the Book Project work. It included setting up meetings, reviews, interviews, field trip visits, gaining access to community resources (accommodation, admin office space, vehicle), extending the social support network by seeking contact details for new traditional knowledge contributors. The Collaborative Yarning was the essential precursor for the smooth running of the bookwork.

Cross-cultural	Cross-cultural Yarning involves the Aboriginal participant or researcher adjusting their behaviour or practice to operate within Westernised rules and protocols, for example, the researcher explaining the Western research process in universities.[3]	Cross cultural	Cross-cultural Yarning for this study embraced all Yarning with the Aboriginal participants in both traditional communities because they were all conversing in standard English instead of their first language. This category was inappropriate for the Southern Community.
Research Topic	Research Topic Yarning is a Yarn with a purpose.[2] This is used to gather information relating to the research question, sometimes in the form of stories.[2]	Project related	The Project Yarning covered all aspects of the bookwork, including reviewing the iterations, expanding on ideas for new topic content, visiting and exploring cultural sites and conducting semi-structured interviews.
Thera-peutic	A Yarn that involves the participant sharing personal and, at times, emotional parts of their story.[2] During this step, the researcher's role changes to supporting the participant to make sense and meaning of their story.[2]	Reveal-ing	This Yarning was revealing in nature, both emotional and sensitive in content, with personal revelations. They were always spontaneous and unexpected, occurring in chance encounters out in the open, at social gatherings or at home. Usually, it was to seek personal advice, share a concern, or provide an emotive overlay to their Dreaming narrative.
N/A	N/A	Collegial	Collegial Yarning is more complex, of increased modality, with a conceptual base that, in part, identified future positive potential for the bookwork, including its reconciliatory nature. It was refreshing and very enabling to transcending the 'now' to 'beyond', conceptualising its use in schools. Phone calls were also not uncommon. The participants were all educated to at least year ten level, the majority with a post-secondary qualification.

1. Table adapted from Atkinson et al. (2021, p. 2);
2. Bessarab & Ng'andu, 2010;
3. Walker et al., 2014;
4. Adams & Faulkhead, 2012;
5. Gibson et al., 2020;
6. Reilly & Rees, 2018.

Furthermore, the Yarning type frequency counts per Community for this study provide greater detail indicating the comparative extent of conversational engagement for each Community at a base level. The link between conversation and Social Yarning type, derived from the analysis of the data bank, the diaries and field notes, indicates that the totals for the Social type Yarnings roughly equate to the total number of conversations overall.

Table 5.3 shows the frequency count of each talking type for the relevant Community.

Table 5.3 Yarning Type Counts per Community

Community	Aboriginal participants	Face-to-face Yarning									
		Aboriginal							non-Aboriginal		
		Soc.	Collab.	Fam	Proj	Rev	C-C	Colleg.	Soc	Collab.	Proj
Top-End [68][1]	23[3]	197[2]	151	101	65	30	174	27	82	82	14
Centre [55]	21	87	57	31	22	12	73	0	90	76	5
Southern [172]	38	303	238	154	83	54	21	81	69	64	28

[1]Days in Community;
[2]Frequency count
[3]Frequency count

Table 5.4 provides additional clarification to Community-based Yarnings by converting each Yarning type as a percentage of the Social type Yarnings.

Table 5.4 Percentage Yarning Type per Community

Community	Social	Collab.	Family	Project	Revealing	Colleg.
Top-End	100[1]	75	50	33	15	14
Centre	100	66	33	25	14	3
Southern	100	78	50	27	18	27

[1]Percentage of all talks

Of interest is the obvious similarity between the Top-End and Southern Communities for the Family and Collaborative type talks. Comparing respective Yarning situational contexts suggests two main reasons for this. The first was the comparative ease of verbal communication between the researcher and the Aboriginal participants. The Top-Ender people spoke English at a level that, while variable in standard, was uniformly adequate to hold a lucid face-to-face conversation. Hence, when in a family situation, the researcher was generally able to follow the conversation and respond accordingly. The older family members were more constrained with their talking but still managed to get their point of view across. In the Southern Community, conversations were essentially free flowing and unrestricted.

The second reason relates to the opportunities to Yarn with families. In both the Top-End and Southern Communities, venues such as the social club and home provided solid bases for Family Yarnings, venues where everyone was more relaxed and able to turn their minds to family matters. The Centre Community was by comparison, more rigid and structured in terms of researcher verbal interaction with the participants. Home visits were less frequent, and the main venue where the Community would congregate, on social service pay day, was the store or 'Canteena', as it was called – a busy, noisy and dusty venue that was far from ideal for Yarning with anyone.

The original book research, in both the Top-End and Southern Communities, was more complex and multi-faceted, and involved more participants. As a consequence, the work involved a higher percentage of Collaborative Yarning. Adjunct to this was, of course, the higher level of spoken English. In the Centre, the bookwork essentially involved one family, with three other principal contributors from other families.

Speaking as self

I realised fairly early in my analysis that for each Community I had my own little story to tell, and that for the participants there was a story for each of them also. Interestingly, the situational contexts to these stories were just as important, adding richer detailed texture to the pedagogical cloth. While it did take me a while to understand old Bobby and Aunty Penny, we eventually got through to each other as I became accustomed to their particular pronunciations and English word derivations. These two 'oldies' were the salt of the earth, the primary knowledge providers, and they had no equal. The younger participants in each of the traditional communities, fortunately, had much better English language skills so interpersonal communication had been far easier.

I found that the way I spoke to a participant was often determined by where we were at the time, what we were talking about and what we were doing. If the Yarning was revealing in nature, then there was an evocative story as well, with emotional overtones, and the sudden realisation for me that I was being trusted with the information. There were similarities and differences between the three communities as you might expect. On average there were 8 yarns held with each participant for the Top-End and Southern communities, 4 for Centre, but the overall time required in the Southern Community was much greater. The Centre Community was the real challenge, however, being so far out of town, hence less time and opportunity for socialising. There were no designated social venues, other than the church and opportunities to Yarn here were difficult because I didn't know the language and the Others did not know English well enough. Also, being a 'dry' Community, there was no alcohol – or supposedly not.

5.2.7 Rationale for Choice of Yarning Descriptors

In the previous section I have indicated that independently, I found six categories of Yarning to describe the verbal interactions while engaging with my Aboriginal participants. These agree essentially with those described in the literature (Bessarab and Ng'andu, 2010; Dean, 2010; Walker et al., 2014).

While my names for Yarning types differ from the literature's, my choices reflect this study's different focus on Yarning contexts and situations and, to a certain extent, are reflective of the learning and teaching I experienced. Notable differences are with the terms 'Research topic' and 'Project related'. At the time of my original community fieldwork, the focus was entirely on the 'project', hence the choice of name. My choice of 'Revealing' was similarly guided by the combined spontaneity, emotionality, and candour of this Yarning type. Probably, and in all honesty, it was these Revealing Yarns that taught me the most.

The term ‘Collegial’ was a natural choice as, after all, these respective participants were in every respect, my colleagues. Our Yarnings often involved more abstract themes such as the book’s potential and future value and acknowledging joint community ownership. They realised their contribution to the project, providing ongoing guidance, feedback and mentoring, which often provided the handrails and motivation needed to keep me on track during challenging moments of the project journey. In short, these Collegial Yarnings were of a professional nature.

My analysis often dealt with a series of related events within long conversations, where the Yarning would seamlessly slip from one type to another as Stuart and Shay (2019) observed, ‘Yarning can quickly go from formal conversation to an informal discussion about family, history, politics, and other issues. Incorporating Yarning into a research context with minimal scholarship on Yarning as a research methodology was very challenging’ (ibid., 2019, p. 198).

Extract from Field Notes, 1 March, 1996 – Co-operative, Southern Community:

> *Later discussions between Darcy and Uncle Tom focused on [Melbourne academic] who is regarded by various local non-Aboriginal sections of community as an expert on Aboriginal culture, but he does not have the feeling for, nor the perspective or worldview that the [Southern Community] people have. Uncle still uses the fish traps himself. He will come out to the lake and is very happy to help.*
>
> *He agrees with my views on bringing the two cultures together and worldviews together, using the community approach, with traditional knowledge and culture representing a framework and integrating within*

this, relevant pieces of science. Uncle has some valuable ideas, is well read, and should be a tremendous asset to the development of this project.

I discussed the idea of co-op ownership in part, and Darcy recognised the difficulty with this because of the part contribution of each of the three communities. At various stages today I made it very clear that I wanted nothing for myself out of this – and that I'd prefer to see any financial rewards go to the communities.

In the above case, while the Yarning sequence embraced several forms such as Collaborative and Revealing, it mainly serves to stress the collegial nature of my relationship with both Darcy and Uncle Tommy. The Collegial Yarning covered aspects of co-ownership with the Community, and importantly, provides an implied but clear understanding that our co-creation of new science knowledge, bridging the two worldviews, was not only plausible, but entirely workable and achievable. It needed to be addressed sensitively, paying due respect to the Community. Conversations such as this typified the professionalism that played out, with each one of us representatives of a specific knowledge area, Aboriginal traditional knowledge and culture on Darcy and Uncle's part, and Western science on mine. We were co-creating new knowledge, a fusion of the Aboriginal space with the Western science, where one knowledge base is understood to be equal in standing to the other.

5.2.8 Gatekeeper or Facilitator–Liaison?

This section discusses those Chapter Four's findings, which appear to be confirmed by the literature research, and refer to the gatekeeper, or 'facilitator–liaison', the term opted for in this study.

Speaking academically

The literature, predictably, contains a significant body of research material referring to the concept of gatekeeping (Brown et al., 2020; Caretta, 2014; Rioux, 2018; Shay 2016). The Gatekeeper has been written about across a variety of disciplines (Shay, 2016, p. 283). Shay (2016, p. 284,) does not understate the importance of Gatekeepers to field research – 'The unpredictability of how relationships are operationalised in gatekeeping/researcher interactions matters because it impacts how knowledge is produced'. Furthermore, Shay (2016, p. 285), citing the dictionary definition, reports that 'gatekeeping generally in Aboriginal and Torres Strait Islander communities is also not an unfamiliar concept. The Merriam-Webster dictionary defines gatekeeping as "a person who controls access"'.

Le Compte and Preissle (as cited in Kawulich, 2011, p. 59) report that 'key informants, many times, serve as gatekeepers … [and suggest] that the researcher locate gatekeepers informally and in person; this is particularly important in indigenous communities, where relationships are integral to one's acquiring cultural knowledge'.

Rioux et al.'s (2018, p. 5) paper provides further insight into a Gatekeeper's roles, stating 'gatekeepers have an official or unofficial role at the site', and refers to their 'multitasking'. Caretta (2014) also refers to the multitasking role of gatekeepers in her study and widens their roles to providing security for the researcher.

Using the gatekeeper term within the Australian Aboriginal context, however, is problematic. Brown et al. (2020, p. 3) found that 'The term gatekeeper was positively received by some group members, but the majority considered it culturally inappropriate … Participants emphasised the need for an alternative term, with several alternative, simpler terms suggested (e.g., responder, go-to person, tracker, or an Indigenous language word)'. However, the term 'Gatekeeper' provides the most appropriate comparative term for this

study, where its occurrence in the research literature provides a significant evidence-based parallel and similarity to the analysis findings.

One final matter raised in the research literature refers to the gatekeeper-related editing role in both publishing and institutional spheres. Coram and Hallidan (2013, p. 109) describe one other gatekeeper-related dimension – they state that '…engaging as a public intellectual is not as straightforward as it might be due to editorial gatekeeping', adding further that 'it is our experience that part of the challenge in obtaining recognition for our "race work" is educating both the "academy" and the mass media'. In a broader institutional context, Halliday (2014, p. 110) observed gatekeeping of voices of the people, 'But their voices could not have spoken authoritatively without the work of court clerks in an archive those clerks created and controlled'.

Speaking as self

My original choice for this important role was facilitator–liaison, basically reflecting the roles they played, which were facilitating my day-to-day fieldwork, and liaising between me and the other Aboriginal participants, when and where required. Simple as that! So, I have decided to keep my original facilitator-liaison label in deference to Brown et al.'s (2020, p. 3) observation.

Lennie was my facilitator–liaison in the Centre Community. Like all my gatekeepers, he was self-appointed, understood what I was trying to achieve for their children, and volunteered his guidance and advice. I first met him on my second trip, where I explained my role and what my goal was. His help was to be indispensable.

Extract from field notes 3 October 1996 – Centre Community

Met and chatted to Lennie in office – he is assistant to the advisor.

Extract from field notes 4 October 1995 – Centre Community

> *Returned to rock seat area outside council office, close to fuel depot. Lennie (assistant coordinator outstations) was present, and old Wally [local traditional landowner] was also there. Lennie has told me that he informed everybody of my curriculum development purpose for trips. He describes this in terms of doing schoolwork for the Aboriginal kids – and they understand my intention to combine local traditional knowledge and culture.*

I remember feeling chuffed about this, but of course, all the help they offered never eventuated, too many intervening factors and imponderables. Moreover, this was only my second visit to the Centre Community – the first having been eleven months previous.

Sadly, and very unexpectedly, I experienced the publisher gatekeeper personally, when, in the company of a well-known NSW Koori educator, I met with the CEO of a prominent Australia-based publisher. During our discussion, the CEO announced that, of course, we would have to look at two editions of my book, one for 'white' students and another for the 'black' students. I looked across the table at my Koori colleague who, bless her, just rolled her eyes heavenwards.

In closing, one final aspect of the gatekeeper pertinent to this study that has recently been drawn to my attention,[9] is the role the Traditional Owner, or senior culture officer down in the Southern Community, plays in protecting and managing access to the traditional knowledge and artefacts associated with specific cultural sites. I can see the appropriateness for the term gatekeeper in this instance.

[9] In May 2021, during a discussion with Darcy about the merits of gatekeeper this additional role was raised. Good point, I thought at the time.

5.3 Areas Present in Research Literature but Absent in my Analysis

To the best of my knowledge, the material contained in Chapter Two, sections 2.4, 2.10 and 2.11, bore no relevance to the analysis' findings. These topic areas and underlying concepts proved to be outside of the general themes and patterns uncovered. Provided below is a rationale for my decision to exclude Citizen Science as a concept from this Study:

The evidence for Citizen Science (Section 2.4) in my original Community-book-related research proved elusive and devoid of even the most tenuous links. I initially thought that some evidence for Citizen Science, or some variation on this theme, may have emerged from my analysis. However, despite my best-informed attempt, I found it impossible to match what is characterised and defined as Citizen Science with any tangible aspect of my original community-based field research work. The Aboriginal participants were continually and collaboratively involved, but not in the structured and systematic sense prescribed for Citizen Science.

Citizen Science is a well-researched scientific technique that uses community volunteers and provides a tangible and plausible connection between traditional ecological knowledge (TEK) and Western science. (Bhattacharjee, 2005; Dickinson et al. 2010; Couzin, 2007 as cited in Bonney et al., 2009). A collaboration between scientists and members of the public defines Citizen Science in some form, and sometimes this means individuals recruited to help on a scientist-led research project. However, it can also mean partnerships across various organisations from many different sectors in many other cases. (Hind-Ozan et al., 2017).

In an Australian context, Citizen Science is adapting to local needs. Eitzel et al. (2017, p. 8) point out that Citizen Science is rapidly diversifying into new domains (e.g., online) and disciplines (e.g., biomedical sciences), but notwithstanding the flexibility and variety

described above, I would be hard-pressed to accept that my fieldwork in the communities constituted Citizen Science, essentially because there was no prescribed, definable core scientific goal that was being observed for or researched. Furthermore, the Aboriginal participants did not at any stage take observations or record data themselves. Their roles, although variable, were to act as knowledge experts, knowledge sharers, guides, mentors, reviewers and providers of feedback and, not least, as extended family members.

Chapter Two also refers to two associated themes: culturally inclusive Western science textbooks and pedagogical practices that support teaching and learning in cross-cultural, two-way science classes, both of which I ultimately deemed to be beyond the boundaries of this study. They do, however, provide a solid foundation for further research.

5.4 New Findings

This section looks at those findings uncovered in Chapter Four, for which I have not been able to locate any existing reference in the research literature and which appear to be new knowledge. The material refers to the sequential development of the social support network in each Community, a process which necessarily incorporated a new type of Yarning with my colleagues; characteristics linking the talk-type spectrum to specific community locations; an investigation of my Yarnings with my Aboriginal participants through an Enabler/Restrainer lens.

5.4.1 Collegial Yarning

This section addresses the finding in Chapter Four, for a collegial way of conversing, and the signifiers for conversations that had a ‘Collegial’ talk component. While the academic literature lacks any reference to ‘Collegial’ Yarning as a defined conversational entity Dean (2010, p. 7), when referring to Yarning’s research flexibility and adaptiveness, states that ‘it allows the participants, the intended beneficiaries, to become partners within the

research process, not just individual contributors'. The implication here is that local expectations and roles can be negotiated in a collegial and holistic manner during Yarning sessions for the research purpose. Rynne & Cassematis (2015, p. 107) make oblique inferences, commenting, 'appreciative Inquiry demands a collegial relationship between the researcher and the participants'.

In this study, Collegial Yarning became the predominant aspect of my bicultural conversations because the collaborative work was about academic knowledge creation, specifically the cross-cultural science curriculum, which is a specific branch of professional knowledge. Broadly speaking, I would suggest that Collegial Yarning can be regarded as specific type of professional conversation. The Collegial Yarning generated an intellectual environment, an opportunity between equals in collaboration for the co-creation of new knowledge from both Aboriginal and Western Science knowledge bases, where it is understood that both knowledge bases are of equal standing.

5.4.2 The Participant Community Members

Speaking as self

Despite my best attempts, I have been unable to find existing research literature that provides information about the researcher's conversational engagement with the Aboriginal participants regarding their social, family or project-related involvement. I have condensed this section for the sake of brevity.

The analysis indicated my involvement with and reliance upon the participant members from each Community. It also provided a sensitive indicator of the complexity of my community involvement.

My analysis also indicated that each participating member involved with the original book project could be characterised as a member of one or more defined work cells, serving either as a core member or as an ancillary. There were three layers of involvement: first the core group, followed by the first layer of the ancillaries, who I had quite a bit of contact with and support from, and then the second ancillary group – the outer layer – who also provided incidental support but only infrequently, and to a lesser extent. The ancillary participants generally had a lesser role and were usually related to one of the Traditional Owners or Senior Elders. Nevertheless, importantly, they provided me with the necessary after hours, downtime company in a relaxing and social family-oriented environment.

5.4.3 The Participants

This section provides a cross-sectional sample of the participants, providing a snapshot of some of the critical Aboriginal members in each Community. These wonderful people had sorted themselves into basically two groups, which I can term the core and the ancillary, a social dynamic that just happened, in each of the three Communities. There was nothing formal to the structure, it certainly was not recognised nor spoken about at the time, but there it was, something that I can see now.

I like to think of my Aboriginal participants as the gardeners. I am not sure what my role was, maybe the overseer. Anyway, there was no hierarchy, although the core gardeners belonged to either the Traditional Owner group or the senior Elder group, and they were the head gardeners. They were the keepers of the traditional knowledge, the originators of the central theme to the book. Their traditional knowledge belonged to them through inheritance and was manifested and disseminated through cultural and traditional conventions. And obviously, the garden was the Community and its Country, where the seed first appeared – that germ of an idea that literally came out of nowhere. It was the head gardeners who then

disseminated the germ or seed, and then tended, nurtured and nourished that germ of an idea into a plant that grew rhizomes, which ultimately grew their way between the three Communities. The ancillary gardeners also tended to the gardens, assisting with the germination and growth of the rhizomes by providing supplementary, additional nurturing.

What I can see now though was that there was a lot of teaching and learning taking place as well, with each of us teaching each other, and with me probably learning a lot more than they did, a kind of rhizomatic learning through Aboriginal pedagogy that spread from one Community to another.

5.4.3.1 The Top-End Mob

The Core Members were Aunty Penny, Jack, Andy and Hetty. The inner Ancillary members were Toby, Rex, and James and Andy. There were a further 11 outer ancillary members. Table 5.5 provides the number of times I met with Aunty Penny at each work cell location.

Table 5.5 Penny's Work Cell Status and Yarning Type.

Top-End		Member: Penny			Status: Core Group		
Work cell	Soc.	Collab.	Fam	Proj.	Reveal	C-C	Colleg.
Club	3[1]	1	3	0	1	3	0
Home	6	6	6	3	0	6	0
Site	3	3	3	3	0	3	0
[1]Frequency							

Aunty Penny was the senior traditional owner in the Community, and her traditional lands encompassed the Community. She lived in the 'High Camp'; the area traditionally selected by the Aboriginal families with ancestral ties to this Country. Families in the High Camp were all related to the Traditional Owner through the moiety and kinship system.

Aunty's assistance with the bookwork was pivotal to its success. She was pleased to share her traditional knowledge for the book, knowing that the students would get to read about her and her Djang. Her delivery of her Djang account was full of expression and sentiment, and she was very mindful of me paying attention to her, with occasional Dadirri moments, asking, 'Are you listening, Son?' Given that I was then in my forties, I found it quite touching.

Aunty saw that I was helping by carrying her culture to the students for them to learn. The Yarning on Country was sparse, social and collaborative, as she was fully focused on her delivery. Socialising with her in the Club was different, more relaxed, and Yarning about family was usual. She was interested in my family, drawing comparisons with hers. She was sometimes unwell, was a heavy smoker, and quite aged for a traditional, initiated Aboriginal women. I treated Aunty with the utmost respect, was extremely appreciative of her kindness and support, and would often buy her little gifts to show my gratitude. I kept a close eye on her welfare particularly when we were out on Country, in the bush, given that she was in her seventies, and was not as agile as she once was.

Extract from diary

> *11/4/1994 Luggage: 16kg allowance. Jim was bus driver. Checked with Linda (Community school) and was okay for tape recorder. Met with Aunt Penny and Andy. The initial request for assistance was okay. Visited the club and spoke with Jack for a while. He will try to organise recording sessions tomorrow, with Aunty Penny and Andy. Jack said two languages were spoken, the latter is the original and spoken now by TOs. I spoke to Aunt Penny buying her a can of drink. I walked her home, speaking about our families. A misunderstanding occurred soon after leaving the club.*

One of her nephews remonstrated with me, fearing I was humbugging Aunty but she very quickly set him straight.

This meeting with Aunty Penny was the first real opportunity I had had to talk to her. Buying her a drink was being respectful and an acknowledgement of her position and status in the Community. She was after all the senior traditional owner. Her nephew's reaction to me was understandable because this trip was only my third to the Community, and everyone was still getting to know me. Sadly, Aunty passed away before the book was eventually published in 2001. Table 5.6 provides the number of times I met with Jack at each work cell location.

Table 5.6 Jack's Work Cell Status and Yarning Type

Top-End		**Member: Jack**		**Status: Core Group**			
Work cell	Soc.	Collab.	Fam	Proj.	Reveal.	C-C	Colleg.
Club	14	14	8	0	6	14	12
Home	15[1]	15	12	2	6	15	10
Site	3	3	2	3	2	3	3
Various[2]	3	2	2	1	0	3	2

[1]Frequency
[2]Store, Hospital, and outdoors within the Community.

Jack was, as my facilitator–liaison, an extremely valuable member of the core team. His guidance and reassurance were crucial to the development of the book. Jack was one of few fully initiated Aboriginal men who had one foot firmly planted in each world, Aboriginal and Western. Health issues were an ongoing challenge for him due to diabetes complications, and his condition at times impacted on the fieldwork progress. Despite this, plus his onerous and time-consuming wider community responsibilities, he would make time to meet with me, because he was convinced that our work would benefit both Bininj and Balanda Students. He expressed the view that the book would help preserve and maintain culture among the local

youth. Our Yarnings would often be collegial in nature. He has sadly passed, but in 2019 I was very pleased to meet up with his son and grandson when last visiting the community.

Extract from field notes – Friday, 27 September 1996:

> *Location: Top-End, Social club.*
>
> *Jack said it was okay to meet with him tomorrow morning – any time he said. This is a marked turn around as he been very protective of his time, his family time, over the weekends. My involvement with the project has up until now been associated with his work, one of the many different things that he advises on, is consulted on or is expected to adjudicate over because of his high standing in the community. It does appear that I have the stamp of approval and am now seen as part of the extended family. Jack speaks very highly of the project work, and its importance in the education of the Community kids. Also, it's important for the white kids to learn about Top-End culture.*

Table 5.7 provides the number of times I met with Hetty at each work cell location.

Table 5.7 Hetty's Work Cell Status and Yarning Type

Top-End		Member: Hetty		Status: Core Group			
Work cell	Soc.	Collab.	Fam.	Proj.	Reveal	C-C	Colleg.
Home	4[1]	4	2	2	2	4	4
School	9	8	3	4	1	9	8
Site	1	1	1	1	1	1	1
[1]Frequency							

Extract from diary: 25 February 1997

> *1315 – reviewed transcript with Hetty, her interview went very well. Most impressed with her articulation and understanding of her job – she obviously has principal aspirations – speaks confidently and*

knowledgeably about educational matters – sees science functions re observations in the Aboriginal domain as well. I asked Hetty to help with the review and development of work this year and she's happy to be involved. I feel a very valuable asset to project.

Although not a traditional owner, Hetty's ability to provide balanced, informed reviews of the book draft work was invaluable. She was well educated, a trained senior primary teacher with a post graduate diploma in school administration. She was a delight to talk to, and I was privileged to have two visits to her house, a departmental home. Her guidance and feedback for the book projected both worldviews and provided me with the certainty and assurance that the work was on track. She was strong in her traditional knowledge and culturally well connected to Community and had a strong grasp on Western science, which helped me enormously with getting the right balance between black and white perspectives. She also voiced her concerns about the loss of local culture to the younger generations, and saw my book, as did Jack, as a means to reverse the trend. Our Yarnings were typically at a Collegial level.

Table 5.8 provides the number of times I met with Rex at each work cell location.

Table 5.8 Rex's Work Cell Status and Yarning Type

Top-End		**Member: Rex**		**Status: Ancillary Group**			
Work cell	Soc.	Collab.	Fam.	Proj.	Reveal	C-C	Colleg.
Club	7[1]	6	5	0	4	7	4
Council	5	5	5	2	4	5	2
Home	4	1	2	1	1	4	1
Site	1	1	1	1	0	1	1
[1]Frequency							

Extract from field notes – 17 April 1996:

Rex was educated at Darwin college for 5 years. He has partly completed an Adult Education course in community management at Batchelor College. In August of 1994 he was appointed for a five-year term to the Kakadu board of management. He said that the Community's Bininj people needed to work towards self-management and not relying on the Balanda. He expressed dissatisfaction with the current situation, must move towards self-determination, in the long term. He has been upset by Balanda infighting over jobs, who does what? This has made him become angry and frustrated, and caused him to move away from the community, and not be involved. Up until relatively recently, he was the trainee town clerk, but I gather he and the town clerk never had a productive relationship.

Rex was one of the first Aboriginal Community members that I met in the Top-End. He was helpful in setting up the initial contact with Aunty Penny and Jack. By Aboriginal standards, Rex was well educated. I enjoyed some interesting and informative Yarns with Rex. He championed Aboriginal rights, he was vocal about the lack of Bininj self-management and was always keen to update me on his children's progress. Inclined to be forthright, and candid with his comments, Rex would occasionally advise me of my perceived transgressions.

Table 5.9 provides the number of times I met with Toby at each work cell location

Table 5.9 Toby's Work Cell Status and Yarning Type.

Top-End		**Member: Toby**		**Status: Ancillary Group**			
Work cell	Soc.	Collab.	Fam.	Proj.	Reveal	C-C	Colleg.
Art-Craft	7[1]	6	3	3	0	7	0
Club	6	6	3	1	3	6	0
Home	2	2	1	0	0	2	0
Site	1	1	1	1	1	1	0
[1]Frequency							

Extract from field notes – 6th June 1997:

> *Drove back to the flat for tea and then went and picked Toby up. He is a frustrated man – quite well read, educated at Darwin High School. He's not too sure about taking his culture down to the southerners – he's not convinced that Koories are real Aborigines – as he said, they have white ancestors, and to emphasise his point he pinched his black skin on the forearm. He referred to Darcy, and I defended the Koories by saying that they could not help the loss of their culture by the whites. They believe they are Aboriginal and that's that.*

Toby, although what I termed an ancillary member, was a key contributor to the traditional knowledge content. Toby was a traditional artist of high status and had sole rights and responsibility for doing paintings about the Djang that I was using. He shared his skills and knowledge with me to provide valuable and informative supplementary content for the book. His frustration with Aboriginal disempowerment was clearly expressed from time to time, similar to Rex's views. He spoke very good English, expressing his ideas and concerns forthrightly, and our Yarning in the Club were sometimes laced with candour and conviction. I was quite stunned at the revelation of his views about Southern Aboriginal people. I actually found myself defending my Southern friends, as after all they had had no say in what

happened to them, plus, as I explained to Toby, it is not a question of skin or eye colour, it is how you identify yourself, and how the Community identifies you. This discussion typified those occasions where the teaching and learning was mutual, definitely both ways. I would drive him to and from home occasionally.

5.4.3.2 The Centre Mob

The Centre core members consisted of Bobby and Lenny, followed by an ancillary group comprising Jenny and Gregory. There were a further 30 outer ancillary members. Bobby was the Traditional Owner who shared his Tjukurrpa, or 'dreaming' with me. My locational contacts with Bobby were more diversified than for my other participants.

Table 5.10 provides the number of times I met with Bobby at each work cell location

Table 5.10 Bobby's Work Cell Status and Yarning Type

Centre	**Member: Bobby**			**Status: Core Group**			
Work cell	Soc.	Collab.	Fam.	Proj.	Reveal	C-C	Colleg.
Council[1]	3[4]	2	1	0	1	3	0
Clinic	2	1	2	0	1	2	0
Drive[2]	5	5	5	0	0	5	0
Home	12	10	10	3	7	12	0
Linguist	3	3	2	3	2	3	0
Outstation	9	8	9	0	1	9	0
Site[3]	7	7	7	7	5	7	0

[1]Council and vicinity
[2]Family drive
[3]Site & drive to/from
[4]Frequency

Extract from diary – 12 April 1996:

(Paid) $100 to Benny for services rendered. Out at 'Desert Bore' by 0815, brought Bobby and wife into Centre Community, took Bobby out to his

Dreaming site – 4WD track very hard to follow, going in went cross-country, spinifex, picking flat spot over sand ridges, picked up old tracks and followed to the site. – photos, good rock holes, and hollows, ≈ 30 min of recording of Bobby's Dreaming – will be good for unit – rock is a granite type – exhibits exfoliation. Evidence of camels, sad one. Back into town by ≈ 1100. 4WD (Toyota GLX) handled conditions very well, Benny quite impressed. On return we came back via original track, softer sand, and we had no problems. On return to Kintore, Bobby tells me he doesn't smoke or drink – says it's silly – seemed disappointed after he asked if I drank. He's very concerned for his kids – keen to get his brother on the job next time, but I will need to talk down price a bit.

Bobby had a much greater, and more diverse involvement with me than with the others. He would rely on me for transport around the Community, for purchasing goods from the 'Canteena' and conducting hunting trips with his family. He could be quite assertive when he wanted. The number of work cells shared with Bobby was subsequently greater than for any other participant, because being an extended family member contributed to my increased involvement. Our Yarns were heavily influenced by the traditional knowledge sharing and cultural conventions, when arranging for and then visiting cultural sites, and conducting activities appropriate to the family setting were all part of the work. Bobby knew I was doing work for the children, the 'big kids' at school, however, his vision and understanding of the bookwork was immediate to the here and now. Our yarns on the return to Community were often more relaxed and family oriented, and I would learn more about him. I used to have a little chuckle to myself whenever I paid Bobby for his service, in cash of course. He would immediately turn around and give it all to the nearest family member, his wife or grandchildren.

Table 5.11 provides the number of times I met with Lenny at each work cell location

Table 5.11 Lenny's Work Cell Status and Yarning Type

Centre		Member: Lenny		Status: Core Group			
Work cell	Soc.	Collab.	Fam.	Proj.	Reveal	C-C	Colleg.
Council[1]	2[4]	2	0	0	1	2	1
Drive[2]	1	1	1	1	1	1	0
Home	3	3	3	1	2	3	0
Site[3]	2	2	2	1	2	2	0

[1]Council & vicinity
[2]Drive, family outing
[3]Site, incl. drive to/from
[4]Frequency

Lenny was an important core member, filling the role of facilitator–liaison. He was educated in Alice Springs to year ten and spoke good English. He was a source of help in establishing new contacts and developing the social support network. He provided me with pertinent cultural advice from time to time, about protocols and conventions, doing things the proper way. Lenny was also an unexpected source of traditional knowledge content for the book. Hence, our working relationship was expanded to more work cells.

Table 5.12 provides the number of times I met with Jenny at each work cell location

Table 5.12 Jenny's Work Cell Status and Yarning Type

Centre		Member: Jenny		Status: Ancillary Group			
Work cell	Soc.	Collab.	Fam	Proj.	Reveal	C-C	Colleg.
Council	2[2]	2	1	0	1	2	0
Drive[1]	1	1	1	1	1	1	0
Home	3	3	3	1	3	3	0

[1]Drive, family outing
[2]Frequency

Jenny was a wonderful supporter, and her involvement was completely unexpected. She was also comparatively well-educated and spoke very good English. She worked in the council office as an administrative assistant, had noticed my work, and offered help. She

provided new traditional knowledge that has served as valuable supplementary content for the book. Her advice and guidance were particularly helpful. Also, I was welcomed into her home, which was not the norm. She spoke excellent English and had been schooled to year ten in Alice Springs.

5.4.3.3 The Southern Mob

The core members were aunties Lily, Irene and Polly, Uncle Tommy and Darcy. The inner ancillary members were Mike, Aunty Gracie, and Sally. There were a further 25 outer ancillary group members. The essential difference between this Community and the other two, was the closeness I formed with some of the families. This was a natural consequence of the greater length of time spent in the Community, which reflected the complexity of the project work, and the time required to win Community trust and acceptance as a bona fide project worker. The closer connections also reinforced the concept of joint ownership, the fact that the book belonged to them and, importantly, that all future proceeds would go to the Community. The Community's administrative centre, the Co-operative, set up a trust fund which was used to help the Community's secondary students. The Co-operative was also unique situated in this Community, serving the dual purpose of providing essential administrative services and a Community social centre.

Table 5.13 below provides the number of times I met with Darcy at each work cell location.

Table 5.13 Darcy's Work Cell Status and Yarning Type

Southern		Member: Darcy		Status: Core Group			
Work cell	Soc.	Collab.	Fam.	Proj.	Reveal.	C-C	Colleg.
Co-operative	21[1]	21	18	7	8	0	17
Home	13	13	12	6	3	0	11
Mission	2	2	2	0	0	0	1
School	3	3	1	0	0	0	3
Site	15	15	14	15	5	0	14
Various[2]	20	19	10	0	7	0	15

[1]Frequency
[2]Keeping-place, conferences, family functions and outings, workplace.

Darcy was an invaluable core member, being my facilitator–liaison for the Southern Community. The extent and diversity of his contribution to the book's development were unparalleled in all three Communities – the range and number of locations for our Yarning tells it all. Yarning to Darcy was often a delight. He was an absolute raconteur. For me, however, the most intriguing and initially bewildering thing about Darcy was the fact that he was not considered an Elder by the Community. Apparently, he was neither old enough nor grey-haired enough. I have maintained regular contact with Darcy and his family, and they are now among my closest friends.

Table 5.14 provides the number of times I met with Uncle Tom at each work cell location.

Table 5.14 Tom's Work Cell Status and Yarning Type

Southern		Member: Tom		Status: Core Group			
Work cell	Soc.	Collab.	Fam.	Proj.	Reveal.	C-C	Colleg.
Co-operative	6[1]	6	3	1	3	0	4
Home	26	25	25	9	18	0	21
Mission	22	22	22	5	13	0	15
School	2	2	0	2	0	0	2
Site	20	20	11	12	14	0	19
Various[2]	16	12	12	1	10	0	9

[1]Frequency
[2]Family functions and outings, Hospital

Uncle Tom was the main sharer of traditional knowledge. Uncle had been a university lecturer in South Australia, returning to the community to take on the Senior Cultural officer position. Our Yarnings encompassed the whole range and were typically collegial in manner. Information he shared with me had never been disclosed before hence I was extremely privileged and honoured to receive his help. Once again, an influential Community member who saw the value in what was being done. I spent several occasions on social outings with Uncle and his partner, which served the dual purpose of us getting to know each other better and providing opportunities to Yarn about aspects of the project work; how and where we were going with it.

Table 5.15 provides the number of times I met with Aunty lily at each work cell location

Table 5.15 Lily's Work cell status and Yarning Type

Southern		Member: Lily		Status: Core Group			
Work cell	Soc.	Collab.	Fam.	Proj.	Reveal.	C-C	Colleg.
Co-operative	1[1]	1	1	1	1	0	1
Home	5	4	5	3	1	0	3
Mission	1	1	0	0	0	0	0
Site	1	1	1	1	1	0	1
Various[2]	1	1	1	1	0	0	1

[1]Frequency
[2]Community event, family functions and outings, Keeping place

Aunty Lily was, and is still, a wonderfully strong supporter of my work in the Community. She is a highly regarded and well-respected Community member and has a lot of influence well beyond the Community. It was through her help that I gained the extended leave from the education department in 1997 to tackle the fieldwork full time. Aunty Lily's help was critical to the book's success.

Table 5.16 provides the number of times I met with Aunty Grace at each work cell location.

Table 5.16 Grace's Work Cell Status and Yarning Type

Southern		Member: Grace		Status: Ancillary Group			
Work cell	Soc.	Collab.	Fam.	Proj.	Reveal.	C-C	Colleg.
Home	2[1]	2	2	2	2	0	0

[1]Frequency

My introduction to Aunty Grace was arranged through Darcy. Aunty was an expert traditional weaver, and she happily shared her time and knowledge with me, providing for an interesting and highly relevant new section to the book content. A wonderfully kind and supportive person.

5.4.4 Community Social Networks, Positioning and Development

5.4.4.1 Introduction

This study is thoroughly and totally grounded in the fieldwork conducted from 1992 to 2000, totalling 295 Community fieldwork days. During this time, I was privileged to work alongside a total of 86 Aboriginal adults spread across the three Communities.

As far as I can determine, this section represents new knowledge about the capacity for Yarning to assist in the co-creation of new knowledge within the context of Community social networking. My analysis uncovered Community social support networks and their positioning within the original book project fieldwork. I have also included findings related to social network development.

Speaking academically

The literature provides research reports of Scientists doing research work with Aboriginal people in the field. Brennan et al. (2012, p. 37) combined scientific survey methods with Indigenous ecological knowledge [IEK], where 'small teams of trained biologists (6–10 persons) […] worked with local Aboriginal people (10–30 persons)'. The status of their Aboriginal participants as team members was not formally acknowledged. There is also no mention of team development, possibly related to their research's ecological context and the short survey timeline.

The lack of research literature on joint Aboriginal and non-Aboriginal research where the Aboriginal viewpoint is truly presented, is reported by Barbour and Schlesinger (2012, pp. 37–38) who recognise the inequalities in Indigenous and Western ecological research collaborations, stating that

> In Australia, and specifically within the mainstream ecological literature, the majority of the writing about ecological projects involving Indigenous people, or opinions about how to get cross-cultural collaborations to work better … It is also uncommon for non-Indigenous ecologists, to reflect on the personal and professional challenges of working within Indigenous frameworks, undertaking truly participatory research in situations where some of their basic assumptions are likely to be challenged.

Furthermore, any reference to any notion of team or social network development within an Indigenous setting is equally lacking in the research literature. The literature does however contain research work related to small team development in a westernised, culturally neutral context. Tuckman (1965) researched small team development and coined the memorable phrase 'forming, storming, norming, and performing' in his paper, *Developmental Sequence in Small Groups*. The phrase describes the path that teams follow on their way to high performance. Later, he added a fifth stage, 'adjourning' (also known as 'mourning'), to mark the end of a team's journey. Stein (2016), referencing the performing stage, says, 'Roles on the team may have become more fluid, with members taking on various roles and responsibilities as needed. Differences among members are appreciated and used to enhance the team's performance'. This description added qualifying detail to this study's 'maintaining' stage of the social support networks where the work cells were operating relatively smoothly and predictably.

The literature further indicates that researchers researching Aboriginal Communities appear to receive similar introductory advice. Swan (2017, p. 47) notes that 'while on Country, I was advised, and given contact details as to what groups I should yarn with and who I should include as participants'.

Speaking as self

The social support networks in each Community evolved through a series of developmental stages. There were no clear-cut entry/exit points, more a gradual transition phase, with key markers to indicate progress and positioning. I have labelled these stages initiating, building, maintaining, and extending.

I found a sequential development within the social networks for each Community that bore very similar trends across all three communities. Each of the work cells described above had its social network specific to the tasks involved, which essentially identified its Yarning spectrum. Typically, as an example, those work cells indicating higher frequencies of Collaborative- and Project-type Yarning were more likely identified with the site visits, linguist centre, council and co-operative, school, Mission, and Keeping Place. It was the work conducted in these places that drove the book's developmental work.

While these network stages might the same sequential framework, their development was independent of the others, and evolved naturally over time. Surprisingly, they developed in the same sequential pattern. Furthermore, there was no clear demarcation between stages, more a gradual transition phase, with key markers to indicate progress. One example of upward movement was my acknowledged acceptance by, and attachment with families. I found it interesting that my transfiguration within the Community, from outsider-teacher-researcher to an extended family member occurred in each Community between late 1996 and early1997, about two and a half years into the fieldwork, with approximately 30, 30 and 40 days spent in the in the Top End, Centre and Southern Communities, respectively.

The initiating phase was the critical stepping-off point in each case. I arranged the first visit to each Community through recognised channels. Visits were prearranged and assisted by approaching the Community with support, guidance and introduction from an

Aboriginal agency or its representative who was well known to the Community. Without this respectful, preliminary introductory step, initiating work in any Aboriginal Community would be problematic.

Swan's (2017) comments about social networking advice are an accurate reflection of my own work in each Community with respect to the protocols and conventions that would often guide me on each field trip, especially during the early stages of social support network development. An important, clear indicator for the 'building' stage was attaining the all-important stable working relationship with the individual traditional knowledge provider, the Traditional Owner or the Senior Elder. This stage took comparatively less time in the two traditional Communities, spanning a twelve-month period and translating into two or three trips, totalling five and seven days for the Top-End and Centre, respectively.

The Southern Community took between twelve months (12 days over four visits) and up to four years (60 days over 15 visits) to attain the equivalent level of necessary assistance from all individual Elders. Uncle Tom was my main support, but he like several of the Elders took a while to establish the necessary trust and build the essential working relationship. Uncle Jimmy took the longest, into the fourth year, before contributing and sharing his knowledge, and this was only after his two senior sisters spoke to him on my behalf. The Southern Community has lost a lot of its culture thanks to white intervention, and they safeguard what remains. There is no central core Djang or Tjukurrpa left to base your work around – all were lost. Establishing trust and building the necessary working relationships took time. The other complexity was that no one Elder held all the knowledge, as each one has a portion handed down, and my task was to collect integral data that was pieced together into a composite whole. This was the main contributing reason why my total fieldwork days

in the Southern Community was 172, a significantly greater number compared to the other two – Top-End, 68, and Centre, 55.

One key indicator of entry to the ‘maintaining’ stage was the acknowledged acceptance into families, with group announcement that I’d become either a brother-in-law, an uncle, or cousin, at various stages. Transitioning to the extended family member status occurred in each Community between 1996 and 1997, after about two and a half years in the fieldwork program. Achieving extended family member status took approximately 30 days in the Top End, 30 for the Centre, and 40 days for the Southern Community. A strong sense of being welcomed and accepted as an acknowledged Community member accompanied the ‘maintaining’ stage. Things by this time had started to run smoothly; I became more confident and was essentially trained up, with fewer protocol ‘whoopsies’ occurring. The work became more relaxed, with a general feeling of certainty and predictability (at least as far as one can get in an Aboriginal Community).

5.4.4.2 Conclusion

My Community-based participants were flexible and fluid with their roles, as was I. Switching between being an extended family member at home and then, when appropriate, converting to being a fellow collaborating research assistant was simply par for the course. The significant change obviously, as the analysis has shown, was how we Yarned and what we Yarned about. For me, this fluidity of role was the obvious way to go, certainly none of that stand-offish, locked-in, pseudo-professional, objective researcher role stuff. Also, my equivalent Community-based ‘teams’ were well known to each other and they, for the purposes of this study, would often be categorised in more than one team or work cell.

Finishing on a ‘naysayers’ note, any comparison with Tuckman’s (1965) model is potentially problematic. Obviously, my ‘teams’ were only theoretical constructs, and were

not recognised, nor defined in any such way at the time. Comparing my findings with Tuckman's (1965) and Stein's (2016) work is born out of necessity; there is little else to go by. While the evidence from my analysis may point to a similar sequencing trend in 'team' development, it does not mean the respective stage terms are interchangeable. That is certainly another matter and is perhaps one area for future research.

5.4.5 Community Location as a Working Cell

This section addresses the theme of Community Yarning Spectrum and the weightings for each Yarning type. As far as I have been able to determine, this section represents new knowledge.

Speaking as self

I have adopted the term 'working cell' from the business environment, and I have defined it, for my purposes, as an independent group of community members tasked with a specific job while located at a specific place. The 'working cell' construct provides a logical platform for observing and discussing differences between the participant team members in either the core or ancillary layers. Each layer provides answers that are integral to the research question, 'What has been the role of collegial conversations in the mobilisation of Aboriginal knowledge from Country to Classroom?'

Speaking academically

The literature commonly refers to the Yarning Circle as a point of contact designated for prearranged Aboriginal conversations. These events are typically related to health, education, or social justice research purposes. The actual location is not specified but is often associated loosely with a school or health clinic setting. The prearranged intent to use the location for Yarning to generate data is consistent among these cases. This study, however, gives locations identified in each Community where significant Aboriginal conversations

took place. There was never any mention of, nor indeed conception of a Yarning Circle from the analysis. This lack of evidence is indicative of the nature of this study, looking through a reflexive lens well after the event and long before the advent of Yarning Circles. The mob would get together from time to time for a 'deadly' Yarn, often for family stuff or within more formal settings at funerals, but labelling these Yarning Circles would be inappropriate

The Research literature linking Contact Zone and Third Space to Yarning and place or location is scant. However, Somerville and Perkins (2010, p. 16) provide some evidence, noting that

> Through this engagement, the landscape itself became another subject in the research as I recorded my growing responsiveness to place. Place – the actual physical location – seemed to provide a third space, a safe place for all of us in work that might otherwise have been politically fraught.

Somerville (cited in Thorpe et al., 2021, p. 60), proposes that

> … for a critical place pedagogy to develop, learning must be embodied, local, and relational to place, be communicated in stories and other representations and involve a 'contact zone of contested place stories' (2007, p. 153). This involves reciprocal and dialogic processes between people and place and develops in students, deeper, more nuanced understandings of the local environment.

Recent research has explored Yarning in marked contrast to Somerville's experiences, and in more formal settings, State Education authorities are beginning to provide professional cultural awareness training for teachers, through the LAECG or state equivalent. Burgess

(2019, p. 478) reports on her experience as part of a Connecting to Country (CTC), professional teacher learning program,

> The 3-day CTC programme consists of activities such as cultural site visits, field trips to local Aboriginal organisations, yarning with Elders, community members and families, and listening to Aboriginal students talk about their school experiences.

These CTC Aboriginal pedagogical programs being delivered through Yarning, are becoming very much a part of a teacher's working cell routine, perhaps removed from their normal teacher environment, but nevertheless form an intrinsic component of their teaching duties.

Speaking as self

My goodness, how true these observations ring for my own experiences in Community and on Country. Sometimes, my Community and Country field trip experiences, while perhaps considered safe in an OHS sense, were at times emotionally or physically draining, and on occasions both. And sometimes what I learnt through listening and observing was an extension exercise, well outside my usual experiential frame. The introduction of CTC programs (Burgess, 2019) are a welcome addition to teacher training especially for those teachers in schools within Aboriginal Communities with significant Aboriginal student numbers. These formal programs are in marked contrast to my cultural awareness training. My enculturation program was incidental to the book project work, when I was actively listening and learning as I worked alongside my Aboriginal colleagues. On some occasions in the Southern Community, I found my culture awareness 'training' quite confronting and was left feeling very uncomfortable when being told about particularly unpleasant racially motivated incidents from the past which had had traumatic repercussions

on the Community. These accounts were always charged with emotion but interestingly, hatred was never expressed.

In the present study, the Yarning locations common to all three communities were the cultural sites, the schools, homes, and outdoors. I have also used the collective term 'Various' when referring to less frequently attended venues. The term 'home' for the traditional communities meant either under the verandah or immediately adjacent to the house, usually under a shade cloth shelter.

Unique to the Top-End Community was the Social Club, which for my purposes, provided a dual role: socialising with my participants and their families and also catching up with and planning with the core team players for book project work. Venues were common to the two traditional communities, specifically the store, council office, and art-craft centre. Locations and social functions within the Southern Community were diverse. Unique to this Community were the Co-op, pub or cafe, outdoor sports events, and family-related functions, like funerals. I found from the analysis that each location's work cell had its Yarning spectrum, a uniquely associated blend of Yarning types. Table 5.17 shows the Yarning frequencies for the primary contact locations in each Community.

Some of the Yarning frequency results are intuitive where, as the reader might expect, increased social Yarning occurred at socially oriented places like the club, home, school, and the council or its southern equivalent, the Co-operative. The council in both traditional communities was the first contact spot. Aside from sorting out entry permissions procedures, I had to get the latest gossip and news, such as deaths in the Community, before moving onto anything else. The Mission was a location unique to the Southern Community with strong historical and cultural ties. Much of the Yarning that took place here occurred at special social get-togethers. The Family Yarning also tended to be intuitive, at home in the Top-End

and Southern Communities, the Mission in the Southern Community, and the club in the Top-End. Once I reached the 'maintaining' level within social networking, I was more comfortable mixing with the mob.

The co-operative was uniquely situated in that the frequency and likelihood for Social, Family and Collaborative Yarnings were all relatively high, reflective of its dual business and community social centre role. The Top-End's social club also served as a multipurpose venue, where aside from the obvious Social and Family-focused Yarning, there were also opportunities to arrange for onsite visits and meetings later during the visit.

Labelling the Social Club, a 'work cell' may seem counterintuitive to the reader, but the 'Club' was the best spot to catch up with the key participants. They were more relaxed and were not rushing off anywhere. In retrospect, it was a remarkably effective place for a Collaborative Yarn and arranging for project-related business later on during the visit.

Table 5.17 Community Face-to-face Talking Locations

Community	Community location visited													
	Airfield	Art-Craft	Church	Club/Pub	Co-op	Council	Keeping Place	Gov. Agency	Home	Linguist	Mission	School	Site	Store
Top-End	[1]2	8	2	24	0	24	0	3	35	1	11	0	24	9
Centre	6	2	3	0	0	17	0	0	18	0	11	0	2	11
Southern	1	1	3	3	40	0	5	19	65	3	0	18	16	5

[1]Frequency count for location

What was fundamentally evident from my analysis was the underlying reality that I was working with real people under real conditions and within real situations, all exacerbated by working with them over a protracted time. My Aboriginal participants were often beset by their own issues, reflecting personal medical and family concerns. Typical cases were Jack, Tom and Bobby.

I have also attempted to provide for the reader some measure of understanding of my actual movements in and around the Community work cell places, averaged out over the field trips. Figures 4.12, 4.13 and 4.14 provide an indication of the movement patterns with each Community and Country. An example of a strong and consistent locational corridor was between the Home and Cultural Site. A similar strong corridor was between the Home and Council or the Co-operative. A strong Top-End-specific corridor was the Home to Club, while the Southern Community shows a strong corridor linking the Home, Co-operative and Cultural Sites.

Furthermore, there was a close fit for Yarning spectrums in some cases for comparable venues at all three communities. The council, co-operative and schools reveal similar Yarning spectrums with higher loadings for Social and Collaborative types. The cultural site visits were also similar with Yarning spectrums, indicating consistently high social and collaborative loadings, and a strong tendency for both 'Family'- and 'Project'-related Yarnings. The Social and Family Yarning tended to occur more on the drives to and from, and more so on the return journey back to the community. On site, it was more down to business with the Collaborative- and Project-type Yarnings.

5.4.6 Community Enablers and Restrainers

This section addresses the findings from Chapter Four, relating to enablers and restrainers, and is confirmed by the Research literature. Todd (2018) researched the third space within the Western Australian civil construction industry context. Her research reveals the enablers and restrainers to shared understanding between Aboriginal and non-Aboriginal people. Some of these enablers (e.g., cultural competence related) have corresponding restrainers (such as low cultural awareness).

5.4.7 The Facilitator–Liaison as Enabler

Todd's (2018) discussion about the uniquely enabling advisors and mentors possibly reflects my own insights into the facilitator–liaisons who supported my community work. They were enablers, and on occasion also acted as restrainers. Their advice and guidance given during the early stages of the social support network development was critical to the eventual success of the book project. They smoothed the way while occasionally pulling me up with cautionary advice, causing me to think reflexively about my impulsive and overly enthusiastic Self.

5.4.8 Finances as Enablers and Restrainers

My introduction to payment for service culture was at the Centre Community. It never occurred in the other two communities, except for one isolated incident in each Community, but these were very much the exception.

This extract from my work diary, Wednesday 10 April 1996, will give the reader some idea of how the interplay and sequencing of enablers and restrainers could occur in the Community.

> *Back at the council, I met Lenny [Aboriginal admin assistant], who suggested I speak to old Bobby – but he charges. Bobby came over to his 4WD, and Lenny spoke to him – he suggested $500 for 1–2 days – I explained that this was too much.*

This extract demonstrates the situational dynamic between enablers and restrainers. Lenny's liaising with Bobby was critical to the book development, but his actions as facilitator also introduced the fee-paying element into the fieldwork. The fact that I was going to be paying for services rendered had never crossed my mind. After all, it did not happen in

the other two communities. The research literature's contribution to financial enabling in Aboriginal Community research is sparse, but Campbell and Christie (2009, p. 13) note the importance of acknowledging and paying for Indigenous knowledge contributions as an enabler.

5.4.9 Engaging with Family and Community as an Enabler

Later that Wednesday afternoon, old Bobby asked me to take him out to collect his son and daughter in law. It turned out to be a 300-kilometre round trip, but Bobby was quite assertive, and I assumed that this was an expectation and events like this, plus the running doing errands, were all part of joining in with the family.

> *(13:00hr) Later took Bobby almost to Mt Liebig, stopped on the way to check abandoned car – not his son's – found son Jackson and daughter-in-law, Amy, on the side of the road, sitting under a tree. Brought them back, stopping at a tank (with windmill) on the way, back by 16:05 hrs.*

This Wednesday's happenings were not atypical for the Southern Community, a fair indicator of my level of involvement with the families and Community. I had to be one of the mob; otherwise, how could I faithfully represent them in the book? I needed an insider perspective to present an honest, accurate and fair picture for the student readers.

I have borrowed the term 'knowledge worker' from the business/commercial world. The Cambridge Dictionary informs us that a knowledge worker is 'an employee whose job involves developing and using knowledge rather than producing goods or services'. Okkonen et al. (2018, p. 1) refer to enablers and restrainers in their paper related to knowledge work. Knowledge work (KW) has risen to a significant role in modern societies, leading to

increasing numbers of knowledge workers. Knowledge work (KW) and the traditional professions are changing in many ways, opening up new vistas.

The physical work environment is a crucial enabler. Peterson and Beard (2004) discuss that the workspace needs organising for autonomy and interaction. Their (2004) research breaks new ground in workspace technology and its effect on team performance; they conclude that 'if the future function of work continues to require the combination of collaboration and individual concentration at work, then the new form will have to combine private workspace with collaboration workspace (p. 1761)'. One critical physical goal in each Community was acquiring my office workspace, and indeed it was noteworthy:

Top-End community – 21 January 1997

Met with Harry [CEO council] (brief), Danny present, spoke re 4WD availability, should be okay and office space also.

Centre community – 29 January 1997

Visit Council speak to CEO [Council]. May get the use of Police Aide office next trip.

This was most welcome news because, by this stage of my work in the two traditional communities, I was well into writing up the book's drafts, which had to be immediate and ongoing. I needed somewhere relatively clean with a desk. My usual accommodation was in the 'Tradies' compound, very basic with minimal amenities and very, very dusty. Continual review by the core working cell members was essential for maintaining cultural sensitivity and accuracy. The Top-End visit was during a late 'Wet', and I had to fly in, so accessing a council 4WD was another enabler, simply because I could physically do more on Country – visiting the dry areas at least.

The sheer physicality of the fieldwork was sometimes restraining by its very nature and sometimes aggravated by the climate. I fully realised this physical aspect of my fieldwork once I gained my autonomy of movement on Country. Having acquired the Traditional Owner and Elder permissions, this flexibility to make solo visits to various culturally or geologically significant sites was critical to the work's success.

Another finding of Okkonen et al. (2018) that I can identify with was that routine supports professionals' work, and a lack of a routine causes stress. Even when I'd reached the 'maintaining' stage with social networking, and the fieldwork was running smoothly, there was never an actual routine. Flexibility was the key element, and to be honest, this could be an advantage, notably for last-minute cancellations of a scheduled event. There was always other work to fall back on, which I had to complete sooner or later. While Okkonen et al. (2018) and Leidner et al. (2006) direct their research at the corporate and commercial fields, elements of their research have a fundamental relevance to my study.

5.4.10 Enablers and Restrainers in the Context of Yarning

My findings revealed a positive correlation between Revealing Yarning and the context to the interpersonal situations, which were identified as either enabling or inhibiting.

Speaking academically

The emerging research literature provides cases of evidence-informed protocol frameworks aimed at creating culturally safe and welcoming settings for Aboriginal people, and involve Yarning as the communication medium. Kingsley et al.'s (2021) research in the health field informs a best-practice framework for developing Community empowerment and culturally affirmed gathering places. Kingsley et al. (2021, p. 2) note that 'The concept of "gathering" can refer to many activities in Aboriginal communities which include

ceremonies, sharing food, art, music, language, yarning and storytelling that connect to Country'.

The Macquarie dictionary defines knowledge worker, KW, as 'a person who is employed to acquire, develop or transfer knowledge, such as a teacher, academic, programmer, researcher'. I accept this definition as an adequate description for both my role in this study and for the original book project. When viewed from an enabler and restrainer perspective, the literature reveals a key enabler for the KW can be their physical work environment, which can aid different KW actions, such as acquiring, analysing, and generating information as well as learning, thinking, and collaborating (Bosch-Sijtsema et al., 2010). Furthermore, the organisational culture is also related to the willingness to share knowledge (Leidner et al., 2006). Research has also found that a positive organisational culture can generate a collaborative climate in which open communication is typical to the whole organisation (Sveiby & Simons, 2002).

Somerville (2010, p. 338) provides further insight into Yarning's capacity for deeper, more intense and revelatory conversation. Somerville found that '…specific local places offer a material and metaphysical in-between space for the intersection of multiple and contested stories'. Somerville (2010, p. 326) refers to '…a place pedagogy' where 'deep place learning occurs in a contact zone of contestation', and emphasises through contact zone theorising the importance of holding these different stories in 'productive tension' (p. 338). Furthermore, Somerville (2010, p. 338) through her Yarning research, also identified '…different sorts of "border-work" that were critical to our negotiations in what we called the 'discomfort zone' of cultural contact in the research'.

Table 5.18 gives the Face-to-Face Yarning types associated with those situations where revealing experiences occurred while engaging with my Aboriginal participants. The

analysis identified those Yarnings that were Revealing and these were associated with either enabling (promoting progress) or restraining (impeding progress) consequences. Usually there was an emotional loading associated as well with the Revealing-type Yarnings, where the enabling moments were either uplifting or positive while the restrainers could be downers or negative. Less often, the Revealing Yarn was emotionally neutral.

Table 5.18 The Face-to-face Community-based Yarnings, Enabler, Restrainer and Contact Zone Situations

	Yarning Types							**Situation**			
Community	Soc.	Collab.	Research	Reveal.	Family	C-C	Collegial	Reveal	Enabling	Restraining	Contact Zone
Top-End	190[1]	123	48	31	106	190	29	25	14	7	47
Centre	82	52	20	17	36	82	0	16	8	5	30
South	246	209	104	54	177	0	123	46	28	16	71
[1]Frequency											

The reader will notice that the Revealing Yarns, happily, were associated with a majority of enabling situations.

Extract from diary – 22 March 1996

> *Southern Community: Had a brief talk with Uncle (Tom) after showing him latest (draft) prints. He expressed some concerns about my project. Uncle has expressed some concern at the pace he is moving at moment, is worried at ability to translate cultural matters, traditional knowledge, in a meaningful way into the classroom context – His advice to me was to be patient. – Quite okay for me to keep coming down, appreciates my desire to get to know people, acquaint myself country around the lake – He is very concerned that traditional sites are being taken as a thing of the past*

and be presented as an archaeological artefact stripped of all its culture, and be presented as something dead. He believes that something needs to be done for the younger generation, and appreciates that not all the cultural context can be translated into the classroom. I said that I was prepared to back right away if I felt that what I was doing was unwanted or if I felt I was intruding etc.

Speaking as self

This was still in the early days of my work in the Southern Community, and I had not had much time with Uncle Tom at this stage. We were still coming to terms with our working relationship, trying to reach a negotiated middle ground, a Third Space and Contact Zone that was respectful and sensitive to both our needs. The journey to this point had been challenging at times, and I was learning all the way. But then, so was Uncle. The challenge was to find a space within what Wildburger (2005) calls an 'intersubjective, interculturally adequate contact zone'.

The Yarning pedagogical connections that Somerville (2007, 2010) brings to 'productive tension' and 'discomfort zones' serve as vivid reminders for my own experiences during the fieldwork. My analysis of my Yarnings with the Aboriginal Community members uncovered the Revealing type of Yarning that I took part in, and further, which ones contained a significant emotional loading, either recalled from memory or written down.

In each case, my Revealing-type Yarns involved the disclosure of sensitive, personal content, and in the majority of cases also included some degree of emotional display. My analysis of these situations demonstrated that every Revealing type of Yarning occurred within a Contact Zone third space, where the interactive experience was unexpected and

outside what I considered to have been routine. These were experiences where I was learning something new and was taught a sharp lesson in some cases.

To explain these findings, I'm adopting Johnson's (2013, p. 15) interpretation of the third space as a way of explaining 'a meeting point in which difference is negotiated, power is challenged, and new concepts are born'. Further, my experience demonstrated that co-operating and collaborating in a cross-cultural research team means more than being a member of a team of Aboriginal and non-Indigenous researchers sharing a common purpose and bond.

5.5 Contributions to Scholarship

While this research has made a substantial and original contribution to scholarship in the shadow of both-ways or two-ways education (Wunungmurra, 1988), and more importantly to the science and social sciences as determined by the Australian Curriculum (2015), the new findings of this study also focus on the underlying but seemingly essential Aboriginal pedagogical processes conducted between Self and the Others. What has not been researched before are the behind-the-scenes Yarnings conducted in Community and on Country between Researcher (me) and Aboriginal participants. These Yarnings, of different types, formed the threads that weft and weaved their way through the Community cultural fabric, which were shaped, fashioned and coloured by the interpersonal social dynamics and interplays, to form a rich tapestry symbolised by the mobilisation of co-created new knowledge. Inherent in these Yarnings was the ancillary but vital learning and listening involving Self, which amounted to Self being traditionally taught by the Traditional Owners, as part of his cultural awareness training and enculturation that necessarily backgrounded the bookwork.

The following sub-sections, 5.6.1 to 5.6.6, are shaped around the main research questions and the six sub-questions all of which combine to address a theorisation of cross-cultural knowledge conversations to mobilise Aboriginal Knowledge of Country into the Western classroom.

5.5.1 What Talking Types Took Place to Inform the Mobilisation?

Based on a qualitative and quantitative analysis of the diary and field notes, it can be concluded that Yarning as a face-to-face conversational method provides an appropriate medium for communication when working collaboratively and cooperatively with Aboriginal co-workers tasked with co-creating new knowledge in the form of a cross-cultural, Earth Science textbook. Specific Yarning types identified for the purposes of this study were Social, Collaborative, Family, Project, Revealing, Cross-cultural, all of which approximate to Yarning types that have already been identified by previous research (Bessarab & Ng'andu, 2010; Walker et al., 2014). My contribution to this body of research is that my study has identified a seventh Yarning type: Collegial Yarning. Collegial Yarning can be defined as a more complex form of Yarning, of increased modality, with a conceptual base that, in part, identified future positive potential for the bookwork, including its reconciliatory nature. As a new form of identified Yarning it shows how Collegial Yarning enabled Self and Other to conceptualise the future potential for the research, and it identified those Aboriginal participants who were all educated to at least year ten level, the majority with a post-secondary qualification. It also identifies the importance of different modes of communication including phone conversations in the mobilisation of co-created two-way science education. Collegial Yarning was associated with conversations embracing abstract thought, as evidenced by forming a joint understanding of, and co-working towards co-ownership and distribution of financial returns to the Community.

5.5.2 Who were the Key Players Involved in the Conversations

The key players turned out to be every one of the Aboriginal people involved in one way or another with the original book project. For this study, the Aboriginal people were termed either as core or ancillary depending on their level of involvement. The core participants, the Traditional Owners and the Southern Community's senior Elders, were the direct primary contributors to the book's content. They controlled access, as gatekeepers, to the traditional knowledge that I was totally dependent upon. Their involvement cannot be superseded nor surpassed. The fact that they, as a collective, universally and willingly shared their traditional knowledge with me was both awe inspiring and humbling.

For the ancillary participants, however, even if their involvement didn't directly relate to the research and development work, they still contributed in other equally important and supportive aspects, in sometimes more subtle ways. These people were in my ancillary team. They served as my mentors, confidantes, bearers of personal and sensitive information and snippets of local news, or as an extended family member providing me with the all-important collective attachment to Community. They were family members who willingly intervened in difficult circumstances, usually unseen, to help me navigate my way around a delicate problem. The Community was my collective friend and it backed me and my work.

5.5.3 How did the Conversations Relate to the Different Ways of Speaking, to Location, Relationality and Positionality?

This study has de-structured and blurred the concept of Yarning Circle. Instead, the focus is placed on the impromptu, sometimes spontaneous Yarning gatherings that occur during the course of a day, sometimes with prior planning but mostly without. The Yarning places for this study are identified by their location in Community or on Country. The analysis provided further evidence suggesting a Yarning spectrum's specificity to a location.

The face-to-face Yarning that occurred reflected the Self to Other relationship as evidenced by observable differences in the Yarning spectrums within the social, family or book work context. Positionality was an observable feature often defined by the location, where the participant's role was nuanced yet understood. The Yarnings with an acquaintance tended to be different in composition to those with an extended family member.

This study has identified a key participant in each community as a facilitator–liaison person, one who collectively performed tasks that relate closely with the designated research gatekeeper described in the research literature. While the evidence from this study details individual differences between these three facilitator–liaisons, there are marked similarities between them relating to their Yarning spectrum, role played and tasks undertaken. Yarnings with the facilitator–liaison person displayed a wider Yarning spectrum that was consistent with their broader role and revealed a consistent pattern across all three Communities.

5.5.4 What Were the Enablers and Restrainers Influencing the Collaborative Process, and how did they Impact the Work?

The enabler and restrainer concepts have been adopted for this study as a lens to observe and analyse for those events initially described as 'uplifters' and 'downers'. These concepts emerged in either physical or intangible, social contexts. The physical enablers and restrainer related to variables such as weather and environment, which in turn dictated mode of Community access. Other physical aspects were access to facilities such as office space, or to 4WDs in the community. As the researcher's identity and status grew in the Community so too did the access to facilities. Finances and time release were a constant restrainer placing constraints on the time spent on, and scope of, the original bookwork.

Within the social context, the enablers were often associated with the progressive strengthening of the researcher's acceptance and attachment in the Community. Of interest

was the observed anomaly where this also occasionally worked against the Researcher, creating an inhibiting effect. Further, the sheer unpredictability of Community dynamics related to cultural conventions and mores, life events and ill health matters sometimes forced changes, often at short notice, with the planned field trip schedule. This study extends the application of these concepts to reflect on those social engagement moments and situations that were accompanied by what was identified, and termed in this study, as 'Revealing' Yarnings. While the literature refers to enablers and restrainers operating in various fields, there is no prior evidence in the research literature linking these concepts to a mode of talking, let alone Yarning.

5.5.5 What are the Similarities between Key Aspects of the Fieldwork amongst the three Communities?

No two Communities are the same, and the three Communities featured in this study certainly were not. The Countries were very different and so were the Aboriginal People. Other localised variables were their cultural overlay and how it impacted on Community life. The standard of English spoken varied considerably and dictated the pace and depth of the work. Given the diversity of these Communities, what was remarkable was the positive response from the people to support the fieldwork. Crucial to this was the clear message that the book was for their students as well. Acknowledgement of co-ownership of the book and the collaborative nature of the work were similar positive motivators. The similarity between all three Communities was knowing that their culture and traditional knowledge was, for the first time, being presented in a book alongside Western Earth Science. Their understanding of this was crucial to the success of the bookwork, a compelling reason behind the Communities' support and this awareness, in turn, lead to my acceptance and attachment to each Community. The manner in which I became collectively accepted, attached to and embraced by the Community was simply epiphanic. It would amaze me that after having

been absent for up to six months, my return was treated as if it had only been a day. The people's emotional memories were phenomenal. I would simply resume from where I had left off last trip.

For the purposes of this study, I used Tuckman's (1965) team development framework as a mechanism for comparing respective stages of the social support networking observed for each Community. While the respective terms used in this study for each stage differ from Tuckman's, what was apparent is that the Community support networks demonstrated similar sequencing patterns of team development. Furthermore, the analysis also indicated a tendency for each stage of social support network development to reflect a typical yarning spectrum. The evidence for the sequential and staged development of each Community-based social support network was a significant finding from this study. These networks that were invaluable for the bookwork, and they were found to emerge through the same sequencing and stages, with identifying markers for stage development that were consistent across all three Communities. What was different, however, was the respective time frame involved, and evidence was presented to account for this.

5.5.6 What Were the Lessons Learnt During the Mobilisation

The main lesson was in being forever vigilant and observant for changes at play in the local Community's social dynamic. After all, I was routinely coming back into a community after a prolonged absence, and the Aboriginal people had continued on with their own lives, dealing with all the cultural and traditional demands on top of the usual daily, personal and family routines. So, my work pace and aspirations had to be sensitive to each participant's disposition, hence it was essential to remain mindful that you were co-working with Others who had their own personal lives and issues to contend with. Making an earnest personal effort to get reacquainted with the people as soon as you could, on arrival, was paramount.

I found that the best means for communicating your passion and commitment to them and their Aboriginal Community was through Yarning. I found the Aboriginal people to be very perceptive, and they sensed my willingness to learn from them and commit to learning and complying with their conventions. Just simply doing things the proper way. Being seen as an objective and clinical researcher, distanced from the Community, was not only perceived as confounding, but an obstacle to achieving the depth and level of work required.

5.5.7 Summary and Reflection on the Research

I was introduced to the academic concept of Yarning belatedly, and admittedly with some initial internal resistance. I have however come to understand that the term 'Yarning' that has emerged since my original book research project embraces the conversational encounters that I experienced, and provides a workable descriptor for understanding how I learnt from and was taught by my Aboriginal participants, as part of the Aboriginal pedagogy. The Yarning concept encapsulates those elements of co-sharing, cultural safety and sensitivity of moment, mutual respect and recognition for who you are. I was always accepted for who I was, and acknowledged for the work I was doing, in part for their children. Collectively they embraced me and took me into their fold. And this didn't happen just once but in three geographically diverse locations.

I will address the main question in terms of the sub-questions:

1. The key talking types that took place to inform the mobilisation were a combination of the Social, Family, Collaborative, Project, Revealing, Cross-cultural and Collegial. These Yarning categories together combined to help weave the Tapestry of New Knowledge.

2. The key players involved in the interpersonal verbal communications were all of the Community members, whether they be Traditional Owner or Elder, each one contributing their friendship, stewardship and expertise.

3. The Yarnings that took place were shaped by and related to the location and space, and the space was in turn shaped and determined by the relationality and positionality between Self and the Other and reflected the participant's Community cultural status and identity.

4. The enablers and restrainers that influenced the collaborative process are evidenced in the findings, but in summary, they collectively served to guide, moderate and enrich my learning experience.

5. There were as many similarities between key aspects of the fieldwork among the three Communities as there were differences. However, they were all level playing fields, where fairness, collaboration and co-operation prevailed. These Community fields were the gardens of knowledge, and the gardeners were me and my Aboriginal associates, my co-workers, all working together in the same direction.

6. The lessons learnt during the mobilisation can be summarised as Self being continually prepared to learn from the Others, being patient and humble, and to bring your heart and mind to the work.

5.6 The Key Points

5.6.1 Yarning as Pedagogy

Speaking as self

Now, the big leap forward. Here is what I have found that I think is unique, and this is where I think I am going with it. Essentially, I found that how I Yarned was connected to who I actually yarned with, what we were yarning about and where we Yarned. Interacting with this contextualised dynamic were the enabling and restraining episodic events. So, what I can now propose is that Aboriginal Yarning needs a much more refined theorising of what it actually means, particularly from a pedagogical perspective. All this stuff that I found in my data that is not in the literature still needs to be theorised because it's a very under-theorised area. What has happened is that I have started to do things that have now become much more accepted as an approach, to go on to actually integrating Indigenous knowledge into the Western domain. I am arguing for a theory that provides for a much richer contextualised version for Yarning.

5.6.2 The Realisation – an Epiphany

A collective theory appears to have emerged from this study, one that connects all those elements of Yarning that arose from the analysis and represents a summative outcome from all the teaching and learning that I received from the Traditional Owners and Elders, my Aboriginal friends over the ten years. My experience with all these wonderful Aboriginal people has significantly altered my understanding of pedagogy, because I experienced a role reversal, instead of me being the teacher, I was unwittingly on the receiving end. On every occasion during my field trips, I was learning something new about the participants and their community. There was this ever-present aspect of Aboriginal Elders guiding me in a way that they wanted to engage with me –culturally appropriate, respectfully – so it gave them agency

in their approach to teaching me through their Aboriginal pedagogies. They would emphasise the listening and watching, through repetitive behaviour, learning that was contextualised and holistic in nature, and I would respond by listening actively, behaving appropriately and respectfully.

5.6.3 Putting Yarning into a Situation Context

I learnt to associate the locational context to appropriate type of yarning used, and that the participants determined the type of yarning used, with me adjusting my expectations to my participant. I was immersing myself in their lives, and in the process, becoming culturally aware, learning to speak appropriately and to listen properly. Learning how to bridge the cultural gap, connecting with the participants so as to get the best understanding of them and their traditional knowledge so as to better understand them and, in turn, express their traditional knowledge better in the science book for the students.

Any attempt at theorising the Yarning processes behind the mobilisation will obviously need to encompass what I have uncovered in the analysis. This can be achieved, in part, by accommodating the different conventions and situational contexts for the Yarnings across all three Communities. The basic Community contexts and social dynamics form the cultural fabric underlay and provide the conventions for yarning which, by listening and learning, I was privileged to be taught while in the Community. In so doing, I witnessed the subtle similarities and differences between the Top-End, Centre and the Westernised Southern Communities.

5.6.4 Seeing Country Through Two Lenses

Yarning together collaboratively, Self and Others co-created new knowledge, knowledge that helped me to see Country through two pairs of eyes – Western and Aboriginal. Basically, my story is about how I was taught to Yarn such that I could do the

work to bridge the misunderstandings between Aboriginal science and Western science, and how they could complement each other. It is a very simple case of cause and effect, where if I had not learnt to Yarn properly in the first place, connecting with people, the bookwork would have been impossible. I simply would not have been able to do the collaborative and cooperative work with the Aboriginal people bridging the cultural divide.

5.6.5 Shifting Attitude and Thinking

I learnt to identify Yarning types and contexts, became conscious of my shift in attitude and way of thinking about Aboriginal Australia, achieving autonomy and belonging. I am speaking here about a pedagogy where I recognise the strong emphasis is on listening – not just Yarning, but listening – and in the process learning and identifying all the different Yarning types and their contexts. So, there were two parts to the Aboriginal pedagogy that I witnessed, firstly I had to learn to Yarn properly, through the conventions that were unstated but present, by being patient and not pushy, not rushing, being respectful, and choosing the appropriate time and place to Yarn about the book related stuff. What I found is that with Yarning, teaching and learning as I knew it was replaced by speaking, listening and watching. These two sub-categories to Yarning are badly under theorised in the literature.

5.6.6 Yarning Towards Reconciliation

I was taught to listen and to speak properly, and in the process, I have been de-colonised and encultured. Sure, this happening takes time, with many subtleties and nuances along the way, but it is a certainty. My argument is for expanding our concept of yarning. I see it as a very important but under-utilised process for ‘bringing us all together, all under the one umbrella’, as my friend Jack would say. So, what I can now propose is that Yarning needs a much more refined theorising for what Yarning actually means, particularly from a pedagogical perspective. I see this is an emerging field, and I sense that by doing this work

we are creating a further pathway towards decolonisation, towards empowerment for the Aboriginal people, and achieving real equality and equity. It is in effect, theorising for reconciliation!

5.7 Conclusion

Chapter Five has discussed aspects relating the topic 'Yarning Country into Classroom: The role of collegial conversations as yarning in the mobilisation of Aboriginal expert knowledge of Country into co-created cross-cultural secondary Science curriculum'. Specifically, I have examined the centrality of Collegial Yarning and its importance in the process of, and within the context of, a co-created cross-cultural and pedagogical mobilisation of Aboriginal knowledge of Country into secondary-level Western science. The essential overriding focal task for this study is aimed at theorising cross-cultural knowledge conversations to mobilise Indigenous Knowledge of Country into the Western classroom.

This chapter has re-examined, discussed and consequently provided answers pertinent to the main research question, 'What has been the role of collegial conversations in the mobilisation of Aboriginal knowledge from Country to Classroom?' Chapter Five has also traced my journey of personal growth and enculturation that accompanied the Aboriginal Yarning I engaged in in each of the three Communities. My awareness and appreciation of those subtle teaching and learning processes, associated with the Aboriginal pedagogical processes that I experienced during my fieldwork has only arisen through reflexive observation of my time spent in Community and on Country. This rhizomatic learning with all its nuances and subtleties took place at the hands of my Aboriginal teachers, people who in many instances became good friends and eventually 'adopted' me as one of their family. It has become clear to me now that I had to undergo an enculturation process, learning how to behave in the proper way, before I could make substantial progress with the bookwork.

I have discussed various elements pertinent to my face-to-face social interactions and engagement within each Community. I have described how locational context influenced our Yarning styles, and how these compared from one Community to another. I have demonstrated and discussed the variations in Yarning with participants, dependent upon their role within the team. I have also discussed the way in which enabling and inhibiting events impact upon Yarning and what I was subsequently taught. As I progressively learnt the cultural conventions and protocols my confidence grew in tandem with Community acceptance and attachment. Yarnings with my Aboriginal friends and acquaintances, while working in and around the bookwork as knowledge workers, provide a rich picture of a team working together as we cultivated the garden of knowledge. Aboriginal pedagogy at work.

This PhD has allowed me to give greater focus to examining how cross-cultural conversations enable co-created curriculum in science education. It is apparent to me that this study is first and foremost about what I experienced in Community, and how it shaped my behaviour towards socialising and engaging with my Aboriginal counterparts. The evidence underlying the effectiveness of my personal inner transition from outsider to insider was the culmination and realisation of all our collective endeavours, the end product, the published book.

Table 5.19 Summary of Chapter Five Confirmed Findings for Yarnings

Yarning Types			
Author	**Main findings**	**Addressing gap in –**	**New findings from study**
Bessarab & Ng'andu, 2010[1]	Social • Occurs between the researcher and participant before the research or topic Yarn. • Trust is developed and a relationship built. • Topics can be diverse • Topics include whatever social information the participant and researcher share in the • moment.	Lack of diversity for field of study (limited to health)	Social • These Yarns were the initiator for any conversation but sometimes formed the whole Yarn, especially with someone new. • Were used to break the ice, relax, and transfer to the next stage of Yarning. • This Yarning could re-enter as a bridge between other Yarning types in more extended conversations, • just as a bit of 'time out'. • Used more in social spaces and was an excellent way to hear gossip and get community news updates.
Walker et al., 2014[2]	Family • Represents Aboriginal and Torres Strait • Islander peoples' connections and relation- • ships concerning land, spirituality, and • kinship and is utilised to learn about relationality to one another.[2] • It is often used in combination with the Social Yarn.	Limited length of study in Community	Family • Often associated with places of relaxation with a family context, typically the home • and social club, but also during drives to/from the cultural sites. • Once the Traditional Owner or • Elder had relaxed and the day's business had been attended to, we would lapse into Yarning about recent family happenings, including kinship and ceremonial-related stuff. • Often, I would learn about other family members and gain new contacts for support.
Bessarab & Ng'andu, 2010[1]; Adams & Faulkhead[3], 2012; Gibson et al., 2020[4]; Reilly & Rees, 2018[5]	Collaborative • Focused upon research processes.1 • Cases include designing Yarning topics, identifying researcher priorities and • projects, and analysing data.[3 1 4 5] • When used to analyse data, Collaborative Yarning can provide enhanced opportunities • to explore and explain concepts, resulting in new understandings about the research topic.[1]	Restricted status positionality and relationality of researcher/ project leader to Community	Collaborative Yarning • Involved all arrangements in preparation • for the book project work. • It included setting up meetings, reviews, interviews, field trip visits, gaining access • to community resources (accommodation, admin office space, vehicle), extending the social support network by seeking contact details for new traditional knowledge contributors. • This Yarning was the essential precursor for the smooth running of the project.

Walker et al., 2014[2]	Cross-cultural • Involves the Aboriginal participant or researcher adjusting their behaviour or to practice operate within Westernised rules • and protocols; • For example, the researcher explaining the Western research process in universities.[2]		Cross-cultural Yarning • Embraced all Yarning with the Aboriginal participants in both traditional communities because they were all conversing in standard English instead of their first language. • This category was inappropriate for the Southern Community.
Bessarab & Ng'andu, 2010[1]	Research topic • Yarning with a purpose.[1] • This is used to gather information relating to the research question, sometimes in the form of stories.[1]		Project Yarning • covered all aspects of the bookwork, including reviewing the iterations, expanding on ideas for new topic content, • visiting and exploring cultural sites, and • conducting semi-structured interviews.
Bessarab & Ng'andu, 2010[1]	Therapeutic • Involves the participant sharing personal • and at times, emotional parts of their story.[1] • The researcher's role during this step changes to supporting the participant to make sense • and meaning of their story.[1]		Revealing Yarning • Revealing in nature, both emotional and sensitive in content, with personal revelations. • Were always spontaneous and unexpected, occurring in chance encounters out in the open, at social gatherings or at home. • Usually, it was to seek personal advice, share a concern, or provide an emotive overlay to their Dreaming narrative.
		Limit of Yarning scope to low level engagement. Addresses need to recognise higher level Yarning	Collegial Yarning • is more complex, with increased modality, • identified future positive potential for the research recognising its reconciliatory nature. • was refreshing and very enabling to transcending the 'now' to 'beyond', • conceptualised its use in schools. • Phone calls were also not uncommon. • The participants were all educated to at least year ten level, the majority with a post-secondary qualification. • Leads to co-creation of new knowledge.

Yarning Pedagogy			
Author	**Main findings**	**Addressing gap in –**	**New findings from study**
Hansen et al., 2020	• Embedding Aboriginal pedagogy through Yarning. • Formal teaching by Aboriginal pedagogy.	Limited to formal learning situations. Meeting expectations. aim and focus of activity No reference to effectiveness. Short term duration training.	• Pedagogy was informal and ongoing. • Pedagogy was a characteristic of majority of meetings especially over a cuppa. • Pedagogy tended to the stylised and emotive in delivery when on Country, particularly at cultural site. • Pedagogy was incidental to ongoing project accompanying all occasions with Aboriginal people. • Self-awareness of changes in attitudes, e.g., recognition of disempowerment. • Autoethnographic researching of Self. • Awareness of effectiveness of pedagogy.
Harrison & Skrebneva, 2020	• Recognises as Country as pedagogy • Being on Country for cultural immersion. • Actively uses Country as teacher. • Formal Aboriginal pedagogy.		
Burgess 2018,	• Effectiveness of cultural immersion training by Aboriginal pedagogy. • Pedagogical Yarning with Elders		

1. Table adapted from Atkinson et al. (2021, p. 2);
2. Bessarab & Ng'andu, 2010;
3. Walker et al., 2014;
4. Adams & Faulkhead, 2012;
5. Gibson et al., 2020;
6. Reilly & Rees, 2018.

Table 5.19 is a summarised version of Table 5.2. The authors' (Adams & Faulkhead, 2012; Bessarab & Ng'andu, 2010; Gibson et al., 2020; Reilly & Rees, 2018; Walker et al., 2014) contributions to research on Yarning have necessarily been limited by their work to researching in the broad health field. The Yarning research findings to date have been necessarily limited by the parent research field to that of Community health. This study is the first to research yarning within an Education setting, with respect to Community, Country and cross-cultural pedagogy and curriculum. This study is the first to recognise and research Community-based Yarning in Education, specifically the Aboriginal and non-Aboriginal co-creation of cross-cultural curriculum and pedagogy.

The Yarning categories used in this thesis are in the main parallel those adopted by Bessarab and Ng'andu (2010) and Walker et al. (2014), and while noting that my changes to terminology are reflective of the specific situational context pertinent to the Community

based background bookwork, the reader will see an overall close resemblance between the two Yarning category sets. My study has introduced a deepening of understanding of each of the six categories, providing for a richer working interpretation of each. These enhanced descriptions will provide a broader reference basis for future similar education research in the Community.

My biggest contribution to new knowledge about Yarning theory however connects with my Aboriginal colleagues through our Collegial Yarnings. Collegial Yarning by its very nature dispels the myth that Yarnings are restricted to low level, social type conversations. It recognises that Yarning is a capable vehicle for exchanging conversations at higher levels of thought, discussing abstract ideas, formulating futuristic ideas and planning policy. And, most importantly for this study, it was the backbone of the Aboriginal pedagogy I was privileged to experience.

Recent pedagogical based education research (Burgess 2018; Hansen et al., 2020; Harrison & Skrebneva, 2020) posits Aboriginal pedagogy as means for a formalised delivery of cultural awareness training. The general aim of these programs is to empower teachers to more effectively teach their students, both Aboriginal and non-Aboriginal. These formal programs are necessarily defined by time and content constraints and are prescribed by some form of external authority. This is where these authors have stopped, and this is where I have added new knowledge.

With all my findings together, I see patterns that suggest I am actually developing a theory of Yarning as pedagogy and method of cross-cultural educational elements, not just a research method. Yarning is the pivotal ingredient to my thesis, which has drilled down on Yarning in many situations. My study has convinced me that Yarning pedagogy is an Aboriginal thing, on-the-site training, learning as you go. In contrast with Hansen et al.

(2020), Harrison and Skrebneva (2020) and Burgess (2018), my study of Aboriginal pedagogy and Yarning has been contextualised entirely within the Community and on Country. The Aboriginal pedagogical delivery was never formal nor linked to some external authorised agency audit. It was always couched in a natural, and generally relaxed setting. My experience was one of normal, unstructured, cultural knowledge flow, with me actively listening and learning, being taught by my extended Aboriginal family members. It is only in the latter stages of this thesis that I have become aware of the intrinsic and deep connect between Yarning and Aboriginal pedagogy. My study has revealed that both Yarning and Aboriginal pedagogy form a duality, a veritable and inseparable coupling, with one serving the other. And I found time and again that there was no escaping Aboriginal pedagogy, because being in the company of a Traditional Owner or Elder meant you were leaning all the time.

In closing this chapter, I propose a new theory in education, one that posits Collegial Yarning as the shared activity through which recognised Aboriginal knowledge-holders about Country can co-create pedagogy and curriculum with teachers of Western science and mobilise knowledge from Country to classroom. Further, this theory best serves education by embracing all recognised forms of Yarning, which are situationally contextualised by their inherent positionality, relationality and locality with respect to Self and Others co-working and co-creating in Community and on Country.

Figure 5.1 Elements of the Collegial Yarning theory

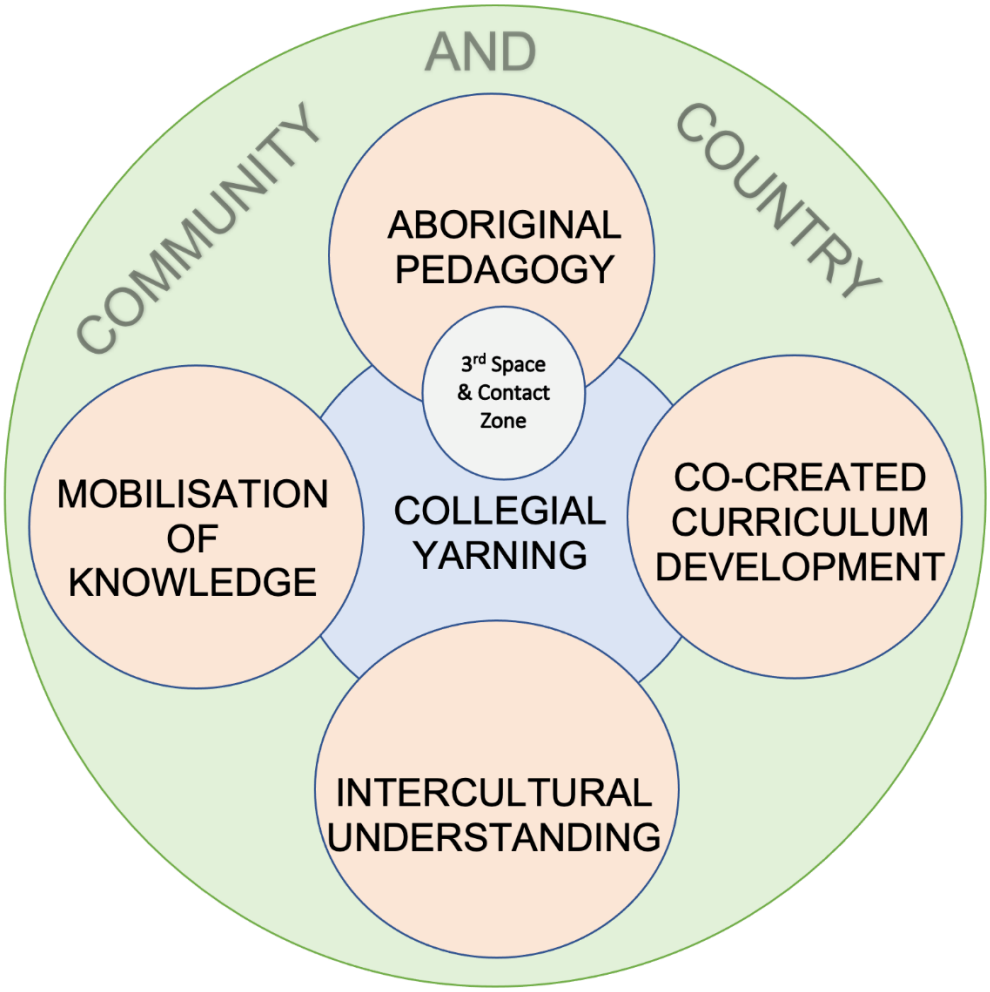


Figure 5.1 connects the set of key elements associated with the proposed Collegial Yarning Theory. I have used the same colour scheme adopted consistently throughout this thesis, representing each of the three Communities studied. These Communities are the starting point, because co-working in Community and being on Country is essential to the success of everything else. The central pivotal educational element is Collegial Yarning, which in turn inter-connects with the important elements of Aboriginal pedagogy, co-created curriculum development, intercultural understanding, and mobilisation of knowledge. The Third Space and the Contact Zones provide the important Yarning spaces that accompany many of the Yarns.

Chapter Six follows, providing the reader with a synopsis of this thesis, recapping the contribution this study has made to academia, noting its limitations and suggesting directions for future research. The chapter closes with an epiphanic statement.

6. Chapter Six – Conclusions

Extract from Field Notes, 6 March 1996, Southern Community, Co-operative

Uncle Tommy is a senior man and together with Uncle Jimmy holds a lot of the traditional knowledge, which to date they have been reluctant to share with anybody else.

I had a long discussion with Uncle, and it left me with a solid positive impression – Uncle will be able to help out, I'm sure. He has completed a graduate diploma in Applied Science at Deakin and has a keen interest in Western Science and professes to be more interested in archaeology – he states that this study of mine needs to be treated with an Aboriginal perspective when sites are visited. He may shortly be supervising two past graduate students from Flinders Uni on archaeology field research and will be responsible for imparting the proper approach in their research outlook. We discussed the need to incorporate Aboriginal culture and knowledge into Western science – I briefly mentioned the polarised theory and thoughts of Yirrkala (Mike Christie) and Stephen Harris. I said I wasn't sure where the project would fit in, into the range of views between these two extreme views, but Uncle agreed with Stephen's view that as long as the communities remain agreeable and supportive then that's' all that's necessary. Uncle is dissatisfied with the cold, impersonal and clinical approach of Western archaeology – also separating research on the fish traps etc. without considering overall Aboriginal perspective – also the lake and its surrounds should not be considered just on their own

as the Gunditjmara country stretches from Lake to the coast shore along the creeks.

This was my introductory meeting with Uncle Tommy, and I remain indebted to him for his help. We formed a team, becoming good mates over the many hours we spent together out in the field, on Country. He taught me so much during those next four years, both personally and book-project-wise. Our Yarns, often intriguing, were priceless, their content ranged between the personal, cultural, the spiritual and Western Science. He was a wonderful teacher, passionate about breathing fresh life into his culture, sometimes at odds with the Community because of his unyielding beliefs, but always giving and patient with me. Occasionally I received a ticking off when my impatience got the better of me. It was a dual act, with Uncle the teacher and me the active listener and learner, and importantly, both of us recognising the importance of the other's role.

6.1 Introduction

This study has presented a story about my face-to-face Yarnings with my Aboriginal co-workers conducted over a ten-year period, from three very diverse Aboriginal Communities, and equally the impact it has had on me. Because, within this story lies another of a deeper, culturally immersive experience, where my time in Community and on Country with the Aboriginal people, through shared and collective experiences, has provided me with the guidance, mentoring, enculturation and traditional knowledge necessary for the production of a two-way, Earth Science textbook. Consequently, my position shifted from one of outsider to insider, as my relationship with Community grew through collective acceptance, and attachment to the principal team members, their families, and all of those associated with the book's development work. This research study has also, surprisingly,

been a journey of self-discovery. I have come out of this study knowing more about myself than when I started seven years ago.

This research was conducted within the context of an overarching analytic autoethnographic methodology and method. An underlying fabric with evocative threads was adopted for the autoethnography, providing the base for the cultural and emotive tones of expression, and within all this is immersed a maths science component, provided by the quantitative thematic analysis, with its statistical and coding content. Reading and re-reading my old diaries and field notes and then analysing them for the conversations (or Yarnings, as I have now become accustomed, for good reason, to calling them) has furthered my understanding of how I have been changed through my work experience in those three communities over that ten-year period. For sure, embarking on an inductive research study was by definition a journey into the unknown. When you then adopt an autoethnography as methodology it only exacerbates stepping out into the unknown, because creating your story will necessarily mean revelations about yourself. The autoethnography has provided me a wonderful opportunity to share with the reader all the dimensions of the fieldwork, encompassing the physicality and emotionality of my time in Community and on Country.

6.2 My Contribution to Scholarship

This research has answered the main question 'What has been the role of collegial conversations in the mobilisation of Aboriginal knowledge from Country to Classroom?' through an analytic autoethnographic approach and by viewing my journey from Country to Classroom through multiple lenses embracing the concepts related to a Community's social network dynamic.

The different forms of Aboriginal Yarning serve as the conduit for the mobilisation of traditional knowledge from Country to Classroom. The major finding from this study was the

extension of Yarning through recognition of a ‘Collegial’ type of Yarning as an additional type to the existing six types. This study has further presented evidence for the existence of Yarning spectrums that appear to be specific to a given Community. In summary, this study has provided evidence, consistently across all three Communities that connects Yarnings with positionality and relationality for Self and Others.

6.3 Limitations of the Research

An overriding limitation to this study’s findings reflects its restricted cultural scope. It could be argued that the three Australian Aboriginal Communities forming the basis for this work may necessarily limit the relevance of findings to other Australian Aboriginal Communities. As a consequence, I have been careful to define the Communities as Australian Aboriginal and not Indigenous. Hence, this study possibly suggests a need for further similar research in other Indigenous Communities, within the broader international and national contexts.

Other limitations for this study ostensibly relate to the analytic, quantitative results. The fact that no recognised benchmark standard is available for testing the accuracy of Yarning type identification suggests an area for future research. Notwithstanding the subjectivity of the overarching qualitative methodology used in this study, however, the consistency of internal analytic processes used for this study across all three communities does provide some measure of reproducibility and validity. This research has been undeniably and immediately limited, through both time and place considerations, simply through the use of data drawn from diary and field notes that were recorded more than twenty years ago. This alone suggests limitations to the interpretation of this study’s findings, and hence any application to, and comparison for future research should be treated with caution. Obviously, it is quite possible that shifting internal social dynamics in the three Communities,

over such a lengthy period, may impact substantially the outcomes of similar future field research.

This study was based on three very different Aboriginal Communities, in vastly different parts of Australia, but the question remains, just how representative are they of all the Indigenous Communities in Australia? After all, these three Communities were originally selected purely on the basis of their potential contribution to a secondary-level Earth Science book, and not for a doctoral study. Finally, this researcher readily admits to not being a trained ethnographer, merely an experienced secondary maths-science teacher who had absolutely no prior Aboriginal fieldwork experience. Consequently, the original diaries and field notes were never recorded with an ethnographer's eye and expertise. Despite this failing however, the diaries and field notes provided a staggering amount of data, recorded in surprising detail, and were originally designed to better prepare this want-to-be autoethnographer for the next field trip.

6.4 Recommendations and Suggestions for Future Research

Ongoing discussions with principal participants in the original Community book research, and other interested parties, have focused on the areas for further research. Anecdotal evidence suggests that the Earth Science book, now published, has sparked interest among Aboriginal teachers in training in Victoria, possibly inspiring them to undertake similar cross-curricula curriculum development on their Country. Hopefully this study will serve to entice other educators to take up the challenge. Any effort to produce cross-cultural curriculum materials must involve forming a partnership with the designated Community, one that is built on mutual trust and respect, co-operation and collaboration, and where Community co-ownership applies.

One of my main findings relevant to this partnership was the previously unrecognised, parallel preparatory on-the-job, cultural awareness training I received while researching for the book, especially in the early stages of my Community fieldwork. As the work progressed, I became more aware of and sensitive to the disadvantages faced by Aboriginal people, not just in the more remote Community but also the Westernised rural Community. My conviction is that the only way this can be turned around, and true reconciliation and equity attained, is through effective education. There is an emerging field in education that seeks to address this through development of curriculum materials that bridge both worldviews.

This study hopefully will provide some measure of guidance for similar educational research work in Aboriginal Communities. Particularly in relation to the need for the researcher to adequately and appropriately prepare for their initial entry into the Community. Having the appropriate backing from an individual or agency recognised by the community is important, and the merits of the research work are recognised as being worthwhile for the Community. What ownership will the Community have, to what extent with the work be co-produced, what part will the community play? My study has demonstrated the effectiveness of analytic autoethnography as a mixed methodology for delivering an accurate and sensitive story enriched by its evocative elements and thematic side shows.

In reference to Section 2.8, I feel it important to emphasise – picking up on the question 'How did Indigenous Knowledges Situate as Science' – an awareness at the time of writing that this area of the analysis and theory could well have been expanded upon. From the perspectives of environmental science/natural resource management a, much stronger case may well have been made for the significance of Aboriginal scientific knowledge by referring to the deep geological, spatial, astronomical and medical knowledges held by the

Indigenous peoples of Australia. I will be taking the opportunity in future journal publications to explore this expanded view in terms of my data.

In my long Section 5.4, 'New Findings', I make no reference to the body of research work enclosed in the (especially early) Australian anthropological literature where I might have found interesting parallels to my own Community and Country experiences, but in my realm of science education, anthropology was not the focus at that time. There most likely would be crossover, but my primary focus was on the education field. I would like to investigate this point further in future writing, as this area of research provides an interesting aspect to return to for a journal.

I am aware that in Chapter Four I did not unpack the idea of 'Yarning' in relation to the various conversation styles that were identified and discussed. At time of writing, I was conscious of the need to limit the chapter size and scope, but certainly this idea of Yarning provides for an interesting focus for future writing.

I am further aware that in my analysis of my communication with Aboriginal Australians I did not look more closely at the long periods of silence which occurred in conversations. I have alluded to one of these silences in my observation of the conversation with Jack, page 221, where I commented in part, '... and in the end to sort of break the silence, I said ...'. Probably these occasions occurred more than I realised, but my personal level of expertise at the time prevented me from perceiving them at a deeper level of understanding. Researching the significance of the conversational silences may well provide an interesting aspect to return to for a journal.

My findings are viewed almost exclusively from the perspective of the researcher and what I learned and experienced to the point where I felt I was the student most of the time. I am however well aware that the encounters were two-way. On one occasion for example,

Jack announced that he and Danny were initiating their own cultural renewal program for the Community's youth, modelled on what we were doing with the book work. Questions such as 'What did his Aboriginal colleagues learn from him?' and 'How did yarning with him enrich their lives and learnings?' would provide an interesting aspect to return to for a journal. I wasn't in a position to ask these sorts of questions and stimulate these sorts of reflections, but I would like to investigate this point further in my collegial conversations with my colleagues and in my future writing.

6.5 A Final Statement

I have now reached the point where I want to start to theorise this story, looking for some sort of theoretical framework for this autoethnographic journey. I have discussed the background to my journey with you: I discussed the contact zone and third space, and how they contribute to my story; I discussed my embeddedness in Community, and then Yarning as it relates to location, positioning and time-space.

I have used this autoethnography to paint a word picture of Yarning. When seen through the kaleidoscopic lenses of evocativeness, voices, third space, contact zone plus the enablers and restrainers, a wholistic picture is presented to the readers who can then share in the events and situations portrayed. Hopefully, something to be nourished and to learn by. Theoretically, in my opinion, Yarning in an Aboriginal context is a multitool, which has a powerful all-embracing capacity for positioning Self among the Others. It determines and develops your relationality, transforming your identity from outsider to insider, and smooths the path towards achieving the joint goal – in this case, the co-creation of new knowledge. Yarning theory is embodied by the completed tapestry, with its various strands, each one labelled and coloured by its unique individual threads of concepts and characteristics all

interwoven into the underlying fabric of the Community and its people. The Yarnings embellish the tapestry.

References

Abu, R., Reed, M. G. & Jardine, T.D. (2020). Using two-eyed seeing to bridge Western science and Indigenous knowledge systems and understand long-term change in the Saskatchewan River Delta, Canada. *International Journal of Water Resources Development*, *36*(5), 757–776. https://doi.org/10.1080/07900627.2018.1558050

Adams, K., & Faulkhead, S. (2012). This is not a guide to Indigenous research partnerships: But it could help. Information, Communication & Society, *15*(7), 1016–1038. https://doi.org/10.1080/1369118X.2012.709260

Adams, M. (2019). Indigenizing the Anthropocene? Specifying and situating multi-species encounters. *International Journal of Sociology and Social Policy*. https://www.researchgate.net/publication/337578451_Indigenizing_the_Anthropocene_Specifying_and_situating_multi-species_encounters

Adams, S. M., Nenonene, R. L., McIntosh, N.A. (2019). Expanding World Views and Supporting Intercultural Competence: A Model for Understanding, Assessment and Growth for Teacher Educators. *Journal of Interdisciplinary Education*, *15*(1). https://ecommons.udayton.edu/cgi/viewcontent.cgi?article=1039&context=edt_fac_pub

Adams, T., Jones, S. H., & Ellis, C. (2016). Conclusion: Storying our future. In *Handbook of autoethnography* (pp. 669–678). Routledge. https://www.taylorfrancis.com/chapters/edit/10.4324/9781315427812-17/conclusion-storying-future-tony-adams-stacy-holman-jones-carolyn-ellis

Afonso Nhalevilo, E. Z. (2013). Rethinking the history of inclusion of IKS in school curricula: endeavouring to legitimate the subject. *International Journal of Science and Mathematics Education*, *11*(1), 23–42. https://doi.org/10.1007/s10763-012-9382-8

Agishtein, P., & Brumbaugh, C. (2013). Cultural variation in adult attachment: The impact of ethnicity, collectivism, and country of origin. *Journal of Social, Evolutionary, and Cultural Psychology*, *7*(4), 384–405. http://dx.doi.org/10.1037/h0099181

Aikenhead G. S., & Michell H. (2011). Bridging cultures: Indigenous and scientific ways of knowing nature. Pearson Education.

Aikenhead, G. (2001). Integrating Western and Aboriginal Sciences: Cross-Cultural Science Teaching. *Research in Science Education (Australasian Science Education Research Association)*, *31*(3), 337–355. https://doi.org/10.1023/A:1013151709605

Aikenhead, G. (2002). Cross-cultural science teaching: Rekindling traditions for aboriginal students, *Canadian Journal of Science, Mathematics and Technology Education*, *2*(3), 287–304. http://dx.doi.org/10.1080/14926150209556522

Aikenhead, G. S. (1997). Toward a First Nations cross-cultural science and technology curriculum. *Science Education (Salem, Mass.)*, *81*(2), 217–238. https://doi.org/10.1002/(SICI)1098-237X(199704)81:2<217::AID-SCE6>3.0.CO;2-I

Aikenhead, G. S. (1996). Science Education: Border Crossing into the Subculture of Science. *Studies in Science Education*, *27*(1), 1–52. https://doi.org/10.1080/03057269608560077

Aikenhead, G. S., & Ogawa, M. (2007). Indigenous knowledge and science revisited. *Cultural Studies of Science Education*, *2*(3), 539–620. https://doi.org/10.1007/s11422-007-9067-8

Aikenhead, G., & Huntley, B. (1999). Teachers' views on Aboriginal students learning western and Aboriginal science. *Canadian Journal of Native Education*, *23*(2), 159-175.

Anderson, K., Gall, A., Butler, T., Arley, B., Howard, K., Cass, A., & Garvey, G. (2021). Using web conferencing to engage Aboriginal and Torres Strait Islander young people in research: a feasibility study. *BMC Med Res Methodology*, *21*, 172. https://doi-org.ezproxy.lib.monash.edu.au/10.1186/s12874-021-01366-y

Anderson, L. (2006). Analytic autoethnography. *Journal of contemporary ethnography*, *35*(4), 373–395. https://doi.org/10.1177/0891241605280449

Anderson, L. (2011). Time is of the essence: An analytic autoethnography of family, work, and serious leisure. *Symbolic Interaction*, *34*(2), 133–157. https://doi-org.ezproxy.lib.monash.edu.au/10.1525/si.2011.34.2.133

Andrews, D. H., Hull, T. D., & DeMeester, K. (2010). (Eds.), *Storytelling as an Instructional Method: Research Perspectives, 3–10.* Sense Publishers.

Angrosino, M.V., & Mays de Perez, K.A. (2000). Rethinking Observation: From Method to Context. In N.K. Denzin & Y.S. Lincoln (Eds.), *Handbook of Qualitative Research*, (2nd ed., pp. 673–702) Sage.

Anthis, K. (2020). *Child and Adolescent Development - A Social Justice approach*. Cognella.

Archer, L. et al. (2015). “Science capital”: A conceptual, methodological, and empirical argument for extending bourdieusian notions of capital beyond the arts. *Journal of research in science teaching*, *52*(7), 922–948. https://doi.org/10.1002/tea.21227

Archer, L., Dewitt, J., & Willis, B. (2014). Adolescent boys’ science aspirations: Masculinity, capital and power. Journal of Research in Science Teaching, 51(1), 1–30. https://onlinelibrary.wiley.com/doi/abs/10.1002/tea.21122

Atkinson, P. et al. (2021). Are you really using Yarning research? Mapping Social and Family Yarning to strengthen Yarning research quality. *AlterNative: an International Journal of Indigenous Peoples*, *17*(2), 191–201. https://doi.org/10.1177/11771801211015442

Austin, J. & Hickey, A. (2007). Autoethnography and Teacher Development *The International Journal of Interdisciplinary Social Sciences*, *2*(2), 369–378. http://doi.org/10.18848/1833-1882/CGP/v02i02/52189

Australia. Review of the Australian Curriculum, author. & Wiltshire, Kenneth W. & Donnelly, Kevin. (2014). *Final report*. Canberra, ACT: Review of the Australian Curriculum, http://docs.education.gov.au/node/36269

Australian Curriculum Assessment and Reporting Authority [ACARA]. (2019, March 19). *Teaching two-way science in Aboriginal and Torres Strait Islander Communities* [press release]. https://www.acara.edu.au/docs/default-source/Media-Releases/20190318-two-way-science-media-release.pdf?sfvrsn=2

Australian Curriculum Assessment and Reporting Authority [ACARA]. (2017). *Science Foundation to Year 10 Curriculum by rows - The Australian Curriculum v8.3*.

Australiancurriculum.edu.au. http://www.australiancurriculum.edu.au/science/curriculum/f-10?layout=1#level3

Australian Curriculum, Assessment and Reporting Authority [ACARA]. (2009). *The Shape of the Australian Curriculum Science*. https://docs.acara.edu.au/resources/Australian_Curriculum_-_Science.pdf

Australian Institute for Aboriginal and Torres Strait Islander Research (AIATSIS). (2020). AIATSIS Code of Ethics for Aboriginal and Torres Strait Islander Research. https://aiatsis.gov.au/sites/default/files/2020-10/aiatsis-code-ethics.pdf

Australian Institute for Aboriginal and Torres Strait Islander Research (AIATSIS). (2020). AIATSIS Code of Ethics for Aboriginal and Torres Strait Islander Research. https://aiatsis.gov.au/sites/default/files/2020-10/aiatsis-code-ethics.pdf

Aveling, N. (2013). ‘Don’t talk about what you don’t know’: on (not) conducting research with/in Indigenous contexts. *Critical Studies in Education*, *54*(2), 203–214.

Bainbridge, R., Tsey, K., Brown, C., McCalman, J., Cadet-James, Y., Margolis, S., & Ypinazar, V. (2013). Coming to an ethics of research practice in a remote Aboriginal Australian community. *Contemporary nurse*, *46*(1), 18–27. https://doi.org/10.5172/conu.2013.46.1.18

Baker, D. & Taylor, P. (1995). The effect of culture on the learning of science in non-western countries: the results of an integrated research review. *International Journal of Science Education*, *17*(6), 695–704. https://doi.org/10.1080/0950069950170602

Baker, M. (2016) 1,500 scientists lift the lid on reproducibility. *Nature*, *533*, 452–454. https://doi.org/10.1038/533452a

Barbour, W., & Schlesinger, C. (2012). Who's the boss? Post-colonialism, ecological research and conservation management on Australian Indigenous lands. *Ecological Management & Restoration*, *13*(1), 36–41. https://doi.org/10.1111/j.1442-8903.2011.00632.x

Barlo, S., Boyd, W. E., Pelizzon, A., & Wilson, S. (2020). Yarning as protected space: Principles and protocols. *AlterNative: an International Journal of Indigenous Peoples*, *16*(2), 90–98. https://doi.org/10.1177/1177180120917480

Barnhardt, R., & Kawagley, O. (2005). Indigenous knowledge systems and Alaska native ways of knowing. *Anthropology & education quarterly*, *36*(1), 8–23.

Bartlett, B. (2011). Stories of reconciliation: building cross-cultural collaborations between Indigenous musicians and undergraduate music students in Tennant Creek. *Australian Journal of Music Education*, *2*, 11–21.

Bazzul, J. (2016). *Ethics and Science Education*. Springer International Publishing.

Beck, K. (2013). Talking Back: Autoethnography and the Contact Zone. *TCI (Transnational Curriculum Inquiry)*, *10*(2), 36-48. http://nitinat.library.ubc.ca/ojs/index.php/tci

Becker-Weidman, A., & Shell, D. (2005). *Creating capacity for attachment*. Wood 'N' Barnes.

Bessarab, D., & Ng'Andu, B. (2010). Yarning about yarning as a legitimate method in Indigenous research. *International Journal of Critical Indigenous Studies*, *3*(1), 37–50. https://doi.org/10.5204/ijcis.v3i1.57

Bhabha, H. K. (2006). Cultural Diversity and Cultural Differences. In B. Ashcroft, G. Griffiths, & H. Tiffin (Eds.), *The Post-Colonial Studies Reader* (pp. 155–157). Routledge.

Bhattacharjee, Y. (2005). Citizen Scientists Supplement Work of Cornell Researchers. *Science (American Association for the Advancement of Science)*, *308*(5727), 1402–1403. https://doi.org/10.1126/science.308.5727.1402

Birks, M., Chapman, Y., & Francis, K. (2008). Memoing in qualitative research: Probing data and processes. *Journal of research in nursing*, *13*(1), 68–75. https://journals.sagepub.com/doi/10.1177/1744987107081254

Bishop, M., & Smith, D. J. (2020). Yarning through the intricacies, tensions, and potentialities of (Indigenous) autoethnography. In P. Stanley (Ed.), Critical Autoethnography and Intercultural Learning (pp. 33–41). Routledge.

Bochner, A. P. (2012). On first-person narrative scholarship: Autoethnography as acts of meaning. *Narrative inquiry*, *22*(1), 155–164. https://www.researchgate.net/publication/261853299_On_first-person_narrative_scholarship_Autoethnography_as_acts_of_meaning

Bochner, A. P., & Ellis, C. S. (2006). Communication as autoethnography. In G. J. Shepherd, J. St. John, & T. Striphas (Eds.), *Communication as Perspectives on theory* (pp. 110–122). Thousand Oaks, CA: Sage.

Bochner, A., & Ellis, C. (2016). *Evocative autoethnography: Writing lives and telling stories*. Routledge.

Bonney, R., Cooper, C. and Ballard, H., (2016) The Theory and Practice of Citizen Science: Launching a New Journal. *Citizen Science: Theory and Practice*, 1(1): 1, pp. 1–4, http://dx.doi.org/10.5334/cstp.65

Bonney, R., Cooper, C. B., Dickinson, J., Kelling, S., Phillips, T., Rosenberg, K. V., & Shirk, J. (2009). Citizen Science: A Developing Tool for Expanding Science Knowledge and Scientific Literacy. *Bioscience*, *59*(11), 977–984. https://doi.org/10.1525/bio.2009.59.11.9

Borch, C. (2002). Interview with Edward W. Soja: Thirdspace, postmetropolis, and social theory. *Distinktion: Scandinavian Journal of Social Theory*, *3*(1), 113–120. https://doi.org/10.1080/1600910X.2002.9672816

Bosch-Sijtsema, P. M., Ruohomäki, V., & Vartiainen, M. (2010). Multi-locational knowledge workers in the office: navigation, disturbances and effectiveness. *New Technology, Work, and Employment*, *25*(3), 183–195. https://doi.org/10.1111/j.1468-005X.2010.00247.x

Botelho, M. J., & Lima, C. A. (2020). From cultural competence to cultural respect: A critical review of six models. *Journal of Nursing Education*, *59*(6), 311–318. https://doi.org/10.3928/01484834-20200520-03

Bourguignon, M. & Katz-Gilbert, M. (2018). The Spaces of Psychical Reality: A Critical Literature Review. *Research in Psychoanalysis*, *26*, 130–141. https://doi.org/10.3917/rep1.026.0130a

Braun, V. & Clarke, V. (2008) Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Braun, V. & Clarke, V. (2016) (Mis)conceptualising themes, thematic analysis, and other problems with Fugard and Potts' (2015) sample-size tool for thematic analysis, *International Journal of Social Research Methodology*, *19*(6), 739–743, https://doi-org.ezproxy.lib.monash.edu.au/10.1080/13645579.2016.1195588

Brennan, K. E., Twigg, P. J., Watson, A., Pennington, A., Sumner, J., Davis, R., ... Underwood, R. (2012). Cross-cultural systematic biological surveys in Australia's Western Desert. *Ecological Management & Restoration*, *13*(1), 72–80. https://doi.org/10.1111/

Bronfenbrenner, M. (1973). Equality and Equity. *The ANNALS of the American Academy of Political and Social Science*, *409*(1), 9–23. https://doi.org/10.1177/000271627340900103

Brown, K., Toombs, M., Nasir, B., Kisely, S., Ranmuthugala, G., Brennan-Olsen, S. L., ... & Hides, L. (2020). How can mobile applications support suicide prevention gatekeepers in Australian Indigenous communities? *Social Science & Medicine*, *258*, 113015. https://doi.org/10.1016/j.socscimed.2020.113015

Buden, B., Nowotny, S., Simon, S., Bery, A., & Cronin, M. (2009). Cultural translation: An introduction to the problem, and Responses. *Translation Studies*, *2*(2), 196–219. https://doi.org/10.1080/14781700902937730

Burgess, C. (2019) Beyond cultural competence: transforming teacher professional learning through Aboriginal community-controlled cultural immersion, *Critical Studies in Education*, *60*(4), 477–495, https://doi.org/10.1080/17508487.2017.1306576

Bush Heritage Australia. (2021). *'Right-Way' Science*. https://www.bushheritage.org.au/what-we-do/science/right-way

Cambridge Dictionary online. https://dictionary.cambridge.org/dictionary/english/goods

Campbell, M., & Christie, M. J. (2009). Researching a University's engagement with the Indigenous communities it serves. *Learning Communities: International Journal of Learning in Social Contexts*, (December), 2–22. https://espace.cdu.edu.au/eserv/cdu:24307/Campbell_24307.pdf

Caretta, M. A. (2015). Situated knowledge in cross-cultural, cross-language research: a collaborative reflexive analysis of researcher, assistant and participant subjectivities. *Qualitative Research: QR*, *15*(4), 489–505. https://doi.org/10.1177/1468794114543404

Castagno, A. E., & Brayboy, B. M. J. (2008). Culturally responsive schooling for Indigenous youth: A review of the literature. *Review of educational research*, *78*(4), 941–993.

Chalmers, A. F. (2013). *What is this thing called science?* (4th ed.). University of Queensland Press.

Chang, H. (2016). Individual and collaborative autoethnography as method. In T. E. Adams, S. H. Jones, & C. Ellis (Eds.), *Handbook of autoethnography*, (pp.107–122). Routledge.

Chereni, A. (2014, September). Positionality and collaboration during fieldwork: Insights from research with co-nationals living abroad. In *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*, *15*(3). https://doi.org/10.17169/fqs-15.3.2058

Chigeza, P. & Jackson, C. (2012). *A holistic approach to TPACK for Indigenous students in mathematics and science classrooms* [Paper presentation]. 'Going for gold!

Reshaping teacher education for the future', the annual conference of the Australian Teacher Education Association (ATEA), Adelaide, 1–4 July. https://atea.edu.au/wp-content/uploads/2012_chigeza_and_jackson.pdf

Chigeza, P. (2008). Language Negotiations Indigenous Students Navigate when Learning Science. *The Australian Journal of Indigenous Education*, *37*(1), 91–97. https://doi.org/10.1017/S1326011100016136

Chinn, P. W. (2012). *Incorporating cultural models into community-based professional development: Impact on teachers' practices, knowledge, and professional networks.* [Paper presentation]. AERA Symposium: Reframing Informal Science Education in Light of Diversity, Equity, Democracy, and Critical Science Literacy, Vancouver, British Columbia.

Christie, M. (2008). Traditional Aboriginal knowledge practices and north Australian biosecurity. *Learning Communities: International Journal of Learning in Social contexts*, *2008*(2), 47–54. https://www.cdu.edu.au/sites/default/files/the-northern-institute/journaljune2008.pdf

Cigliano, J. A, & Ballard, H. L. (Eds.) (2018). *Citizen Science for Coastal and Marine Conservation*. Routledge. https://doi.org/10.4324/9781315638966

Cigliano, J. A., & Ballard, H. L. (Eds.). (2017). *Citizen science for coastal and marine conservation*. Routledge.

Clothier, I. (2014). The Changing Boundaries of Knowledge Between Māori Awareness and Western Science. *Leonardo*, *47*(5), 513–514.

Coade, S., Downey, L. & McClung, L. *The Yarning up on trauma booklet*. https://www.snaicc.org.au/wp-content/uploads/2015/12/02683.pdf

Cobern, W. W, & Loving, C. C. (2001). Defining "science" in a multicultural world: Implications for science education. *Science Education (Salem, Mass.), 85*(1), 50–67. https://doi.org/10.1002/1098-237X(200101)85:1<50::AID-SCE5>3.0.CO;2-G

Cobern, W. W. (1996a). Constructivism and non-western science education research. *International Journal of Science Education*, *18*(3), 295–310. https://doi.org/10.1080/0950069960180303

Cobern, W. W. (1996b). Worldview theory and conceptual change in science education. *Science Education (Salem, Mass.), 80*(5), 579–610. https://doi.org/10.1002/(SICI)1098-237X(199609)80:5<579::AID-SCE5>3.0.CO;2-8

Cobern, W. W., & Aikenhead, G. (1997). Cultural Aspects of Learning Science. Scientific Literacy and Cultural Studies Project, 13. *National Association for Research in Science Teaching, Chicago, IL*. https://scholarworks.wmich.edu/science_slcsp/13

Cobern, W., & Aikenhead, G. (1998) Cultural aspects of learning science. In B. J. Fraser & K. G. Tobin (Eds.), International handbook of science education (pp. 39–52). Dordrecht, The Netherlands: Kluwer Academic.

Conway, K. (2012). A conceptual and empirical approach to cultural translation. *Translation Studies*, *5*(3), 264–279. https://doi.org/10.1080/14781700.2012.701938

Coombes, J., Lukaszyk, C., Sherrington, C., Keay, L., Tiedemann, A., Moore, R., & Ivers, R. (2018). First Nation Elders' perspectives on healthy ageing in NSW, Australia.

Australian and New Zealand Journal of Public Health, 42(4), 361–364. https://doi.org/10.1111/1753-6405.12796

Coram, S., & Hallinan, C. (2013). Resisting critical analyses: gatekeeping issues with Australian Indigenous 'subjects'. In C. Hallinan & B. Judd (Eds.), *Native Games: Indigenous Peoples and Sports in the Post-Colonial World Research in the Sociology of Sport*, Volume 7, (pp. 107–126). Emerald Group Publishing Limited

Corbin, J., & Strauss, A. (2008). *Basics of qualitative research (3rd ed.): Techniques and procedures for developing grounded theory*. SAGE Publications, Inc. https://www.doi.org/10.4135/9781452230153

Couzin, J. (2007). Opening Doors to Native Knowledge. *Science (American Association for the Advancement of Science), 315*(5818), 1518–1519. https://doi.org/10.1126/science.315.5818.1518

Craig, A P. (2001). Culture and Knowledge. *South African Journal of Philosophy*, *20*(2), 191–214. https://doi.org/10.1080/02580136.2001.10878207

Creamer, E. G. (2003). Exploring the link between inquiry paradigm and the process of collaboration. *The Review of Higher Education*, *26*(4), 447–465. https://doi.org/10.1353/rhe.2003.001

Creswell J. W. (2012). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (4th ed.) Sage.

Crotty, M. (1998). *The foundations of social research: meaning and perspective in the research process*. Sage.

Cruwys, T., Berry, H., Cassells, R., Duncan, A., O'Brien, L., Sage, B., & D'Souza, G. (2013). *Marginalised Australians: Characteristics and predictors of exit over ten years 2001-2010.* University of Canberra.

Dale, E., Lee, K. K., Conigrave, K. M., Conigrave, J. H., Ivers, R., Clapham, K., & Kelly, P. J. (2021). A multi-methods yarn about SMART Recovery: First insights from Australian Aboriginal facilitators and group members. *Drug and Alcohol Review*, *40*(6), 1013–1027. https://doi.org/10.1111/dar.13264

Dean, Cheree. (2010). A Yarning place in narrative histories. History of Education Review, *39*(2), 6–13. https://doi.org/10.1108/08198691201000005

Denzin, N. K. (2014). *Interpretive autoethnography* (2nd ed.). Sage.

Denzin, N. K., & Lincoln, Y. S. (Eds.). (2000). *Handbook of qualitative research*. Sage. https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1365-2648.2001.0472a.x

Department of Education and Training. (2011). Embedding Aboriginal and Torres Strait Islander perspectives in schools: A guide for school learning communities.

Depue, K. D., Rosen, R. K., Batts-Turner, M., Bereolos, N., House, M., Forster Held, R., Nu'Usolia, O., Tuitele, J., Goldstein, M. G., & McGarvey, S. T. (2010). Cultural Translation of Interventions: Diabetes Care in American Samoa. *American Journal of Public Health (1971)*, *100*(11), 2085–2093. https://doi.org/10.2105/AJPH.2009.170134

Deslandes, C. et al. (2019). *Two-way Science: an integrated learning program for aboriginal desert schools*. CSIRO Publishing.

Dewilde, J., & Skrefsrud, T. A. (2016). Including alternative stories in the mainstream. How transcultural young people in Norway perform creative cultural resistance in and outside of school. *International Journal of Inclusive Education*, *20*(10), 1032–1042. https://doi.org/10.1080/13603116.2016.1145263

Dickinson, J. L., Zuckerberg, B., & Bonter, D. N. (2010). Citizen Science as an Ecological Research Tool: Challenges and Benefits. *Annual Review of Ecology, Evolution, and Systematics*, *41*(1), 149–172. https://doi.org/10.1146/annurev-ecolsys-102209-144636

Dictionary, O. E. (1989). Oxford English Dictionary. *Simpson, J. A. & Weiner, E. S. C.*, 3.

Diwu, C. (2010). *Effects of a dialogical argumentation instructional model on grade 10 learners' conception of fermentation* (Doctoral dissertation, University of the Western Cape). https://etd.uwc.ac.za/handle/11394/2542

Downing, S. M. (2004). Reliability: on the reproducibility of assessment data. *Medical education*, *38*(9), 1006–1012. https://doi.org/10.1111/j.1365-2929.2004.01932.x

Drummond C. (2009) Replicability is not reproducibility: nor is it good science. In *Proc. of the Evaluation Methods for Machine Learning Workshop at the 26th International Conference on Machine Learning, Montreal, Canada, June 2009*. Association for Computing Machinery.

Dudgeon, P., & Fielder, J. (2006). Third spaces within tertiary places: Indigenous Australian studies. *Journal of Community & Applied Social Psychology*, *16*(5), 396–409. https://doi.org/10.1002/casp.883

Duncan, M. (2004). Autoethnography: Critical appreciation of an emerging art. *International journal of qualitative methods*, *3*(4), 28-39. https://journals.sagepub.com/doi/10.1177/160940690400300403

Easterby-Smith, M., & Malina, D. (1999). Cross-Cultural Collaborative Research: Toward Reflexivity. *Academy of Management Journal*, *42*(1), 76–86. https://doi.org/10.2307/256875

Eitzel, M V et al 2017 Citizen Science Terminology Matters: Exploring Key Terms. *Citizen Science: Theory and Practice*, *2*(1): 1, 1–20. https://doi.org/10.5334/cstp.96

El-Hani, C., & Souza de Ferreira Bandeira, F. (2008). Valuing Indigenous knowledge: to call it "science" will not help. *Cultural Studies of Science Education*, *3*(3), 751–779. https://doi.org/10.1007/s11422-008-9129-6

Ellis, C. et al. (2010). Autoethnography: An Overview [40 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, *12*(1), Art. 10, http://nbn-resolving.de/urn:nbn:de:0114-fqs1101108.

Ellis, C. et al. (2011). Autoethnography: An Overview. *Historical Social Research (Köln)*, *36*(4(138)), 273–290. https://www.jstor.org/stable/23032294

Ellis, C., & Bochner, A. (2000). Autoethnography, Personal Narrative, Reflexivity: Researcher as Subject. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (2nd ed., pp. 733–768). Sage Publications.

Ellis, Carolyn. (1999). Heartful Autoethnography. *Qualitative Health Research*, *9*(5), 669–683. https://doi.org/10.1177/104973299129122153

Fensham, P. (1992), Science and Technology. In P. J. Jackson (Ed) *Handbook on Research on Curriculum*, (pp. 789–829). Macmillan.

Finfgeld-Connett, D. (2018). Introduction to theory-generating meta-synthesis research. In *A Guide to Qualitative Meta-Synthesis* (pp. 1–12). Routledge.

Fleming, T. (2020). The influence of yarning circles: A cultural safety professional development program for midwives. *Women and Birth: Journal of the Australian College of Midwives*, *33*(2), 175–185. https://doi.org/10.1016/j.wombi.2019.03.016

Flückiger B., & Klieve H. (2016) Conceptions of Learning Leadership in Remote Indigenous Communities: A Distributed Approach. In G. Johnson, & N. Dempster (Eds.), *Leadership in Diverse Learning Contexts. Studies in Educational Leadership*, *22*. Springer, Cham. https://doi-org.ezproxy.lib.monash.edu.au/10.1007/978-3-319-28302-9_18

Fontana, A., & Frey, J. H. (2000). The interview: From structured questions to negotiated text. *Handbook of qualitative research*, *2*(6), 645–672.

Fredericks, B., Adams, K., Finlay, S., Fletcher, G., Andy, S., Briggs, L., ...Hall, R. (2011). Engaging the practice of Indigenous Yarning in action research. *ALAR Action Learning and Action Research Journal*, *17*(2), 8.

Gannon, S. (2017). Autoethnography. In *Oxford Research Encyclopedia of Education* (pp. 1–21). https://doi.org/10.1093/acrefore/9780190264093.013.71

Garvey, G., Anderson, K., Gall, A., Butler, T. L., Cunningham, J., Whop, L. J., ... Howard, K. (2021). What Matters 2 Adults (WM2Adults): Understanding the Foundations of Aboriginal and Torres Strait Islander Wellbeing. *International Journal of*

Environmental Research and Public Health, *18*, 6193. https://doi.org/10.3390/ijerph18126193

Geertz. C. (1973). *Works and lives: The anthropologist as author*. Stanford University Press.

George, J. M. (2013). 'Do You Have to Pack?'—Preparing For Culturally Relevant Science Teaching in the Caribbean. *International Journal of Science Education*, *35*(12), 2114–2131. https://www.tandfonline.com/doi/abs/10.1080/09500693.2012.760138

Gergen, M., & Gergen, K. (2000). "Qualitative inquiry: Tensions and transformations." *Handbook of qualitative research*, *2*, 1025–1046. https://www.swarthmore.edu/sites/default/files/assets/documents/kenneth-gergen/Qualitative_Inquiry_Tensions_and_Transformations.pdf

Gibson, C., Crockett, J., Dudgeon, P., Bernoth, M., & Lincoln, M. (2020). Sharing and valuing older Aboriginal people's voices about social and emotional wellbeing services: A strength- based approach for service providers. *Aging & Mental Health*, *24*(3), 481–488. https://doi.org/10.1080/13607863. 2018.1544220

Glowacki-Dudka, M., Treff, M., & Usman, I. (2005). Research for social change: Using autoethnography to foster transformative learning. *Adult Learning*, *16*(3/4), 30. https://doi.org/10.1177/104515950501600308

Goldhaber, A., & Nieto, M. (2010). Photon and graviton mass limits. *Reviews of Modern Physics*, *82*(1), 939–979. https://doi.org/10.1103/RevModPhys.82.939

Gondwe, M. & Longnecker, N. (2014). Scientific and Cultural Knowledge in Intercultural Science Education: Student Perceptions of Common Ground. *Research in Science*

Education (Australasian Science Education Research Association), *45*(1), 117–147. https://doi.org/10.1007/s11165-014-9416-z

Goodall, H. L. (2013). Cool kids on the quad. In S. Holman Jones, T. E. Adams, & C. Ellis (Eds.), *Handbook of autoethnography* (pp. 204–208). Routledge. https://doi-org.ezproxy.lib.monash.edu.au/10.4324/9781315427812

Gorard, S. & See, B. H. (2009) The impact of socio-economic status on participation and attainment in science. *Studies in Science Education*, *45*(1), 93-129, https://doi.org/10.1080/03057260802681821

Goulding, D., Steels, B., & McGarty, C. (2016). A cross-cultural research experience: Developing an appropriate methodology that respectfully incorporates both Indigenous and non-Indigenous knowledge systems. *Ethnic and Racial Studies*, *39*(5), 783–801. https://doi.org/10.1080/01419870.2015.1081960

Grant J., Sivertsen N., Deverix J., & Steeb A. (2021) 'It looks like a breadbox': a pilot study investigating implementation of the Pepi-Pod program with Aboriginal families in metropolitan South Australia. *Primary Health Care Research & Development*, *22*(e29): 1–8. https://doi.org10.1017/S1463423621000293

Grant, A., Short, N. P., & Turner, L. (2013). Introduction: Storying life and lives. In N. P. Short, L. Turner, & A. Grant (Eds.), *Contemporary British autoethnography* (pp. 1–16). Sense.

Gray, G. (2017). Academic Voice in Scholarly Writing. *The Qualitative Report*, *22*(1), 179–196. https://doi.org/10.46743/2160-3715/2017.2362

Gruber, T. R. (1995). Toward principles for the design of ontologies used for knowledge sharing?. *International journal of human-computer studies*, *43*(5–6), 907–928. https://www.sciencedirect.com/science/article/pii/S1071581985710816

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105–117). Sage.

Guerin, B., Leugi, G. B., & Thain, A. (2018). Attempting to overcome problems shared by both qualitative and quantitative methodologies: Two hybrid procedures to encourage diverse research. The Australian Community Psychologist, *29*, 74-90.

Guerin, P., & Guerin, B. (2009). Social effects of fly-in-fly-out and drive-in-drive-out services for remote Indigenous communities [Doctoral dissertation, Australian Psychological Society].

Gundersen, E. (2021) The fundamental principles of reproducibility. *Philosphical Transactions of the Royal Society A*, *379*(2197), 20200210. https://doi.org/10.1098/rsta.2020.0210

Haggis, J., Schech, S., & Rainbird, S. (2007). From Refugee to Settlement Case Worker: Cultural Brokers in the Contact Zone and the Border Work of Identity. *International Journal of Diversity in Organisations, Communities & Nations*, *7*(1).

Halliday, P. (2014). Authority in the Archives. *Critical Analysis of Law*, *110* (2014). https://ssrn.com/abstract=2442530

Halling, H. (1999). From ochres to eel traps: aboriginal science and technology resource guide for teachers. *Science Educators Association, Canberra*.

Hans, S. (2005). Adult Attachment: Theory, Research, and Clinical Implications. Edited by Rholes, W. S., and Simpson, J. New York: Guilford, 2004. Pp. 480. *The Social Service Review (Chicago)*, *79*(3), 566–568. https://doi.org/10.1086/449322

Hansen L, et al. (2020). Reaching Across the Divide (RAD): Aboriginal Elders and Academics working together to improve student and staff cultural capability outcomes. *The Australian Journal of Indigenous Education*, 1–9. https://doi.org/10.1017/jie.2020.23

Harris, S. (1990). *Two Way Aboriginal Schooling: Education and cultural survival*. Aboriginal Studies Press.

Harrison, N. & Skrebneva, N. (2020) Country as pedagogical: enacting an Australian foundation for culturally responsive pedagogy. *Journal of Curriculum Studies*, *52*(1), 15–26, https://doi.org/10.1080/00220272.2019.1641843

Harwood, S., & Eaves, S. (2017, June). *In search for an autoethnographic method* [Paper presentation]. European Conference on Research Methodology for Business and Management Studies, Academic Conferences International Limited. https://www.research.ed.ac.uk/en/publications/in-search-for-an-autoethnographic-method

Harwood, V., & Murray, N. (2019). *The Promotion of Education*. Springer International Publishing AG. https://doi.org/10.1007/978-3-030-25300-4

Hatcher, A., Bartlett, C., Marshall, A., & Marshall, M. (2009). Two-Eyed Seeing in the Classroom Environment: Concepts, Approaches, and Challenges. *Canadian Journal of Science, Mathematics and Technology Education*, *9*(3), 141–153. https://doi.org/10.1080/14926150903118342

Hayano, D. (1979). Auto-Ethnography: Paradigms, Problems, and Prospects. *Human Organization*, *38*(1), 99–104. https://doi.org/10.17730/humo.38.1.u761n5601t4g318v

Hayes, R. L., & Oppenheim, R. (1997). Constructivism: Reality is what you make it. In T. L. Sexton & B. L. Griffin (Eds.), *Constructivist thinking in counseling practice, research, and training* (pp. 19–40). Teachers College Press. https://psycnet.apa.org/record/1997-08618-002

Hefner, C. L., (2014). *Allpsych Research Methods > Chapter 1.11 Replication*, http://allpsych.com/researchmethods/replication/.

Hepburn, B. & Andersen, H. "Scientific Method", *The Stanford Encyclopedia of Philosophy* (Summer 2021 Edition), Edward N. Zalta (ed.), URL = <https://plato-stanford-edu.ezproxy.lib.monash.edu.au/archives/sum2021/entries/scientific-method/>.

Heron, J., & Reason, P. (1997). A Participatory Inquiry Paradigm. *Qualitative Inquiry*, *3*(3), 274–294. https://doi.org/10.1177/107780049700300302

Hicks, D. (2001). Literacies and masculinities in the life of a young working-class boy. *Language Arts*, *78*(3), 217–226. https://www.open.edu/openlearn/ocw/mod/resource/view.php?id=26120

Higgins M. (2021) Unsettling Metaphysics in Science Education. In Jagodzinski, J. (Ed.) *Unsettling Responsibility in Science Education. Palgrave Studies in Educational Futures.* Palgrave Macmillan, 3–52. https://doi-org.ezproxy.lib.monash.edu.au/10.1007/978-3-030-61299-3_1

Higgins, M. (2011). Finding points of resonance: Nunavut students' perspectives on science. *In Education*, *17*(3). https://doi.org/10.37119/ojs2011.v17i3.70

Higgins, M. (2014). De/colonizing pedagogy and pedagogue: Science education through participatory and reflexive videography. *Canadian Journal of Science, Mathematics and Technology Education*, *14*(2), 154–171. https://doi.org/10.1080/14926156.2014.903321

Hill, B. & Mills, J. (2013) Situating the 'beyond': adventure-learning and Indigenous cultural competence. *Discourse: Studies in the Cultural Politics of Education*, *34*(1), 63–76, https://doi.org/10.1080/01596306.2012.698864

Hind-Ozan, E. J., Pecl, G. T., & Ward-Paige, C. A. (2017). Communication and trust-building with the broader public through coastal and marine citizen science. In J. A. Cigliano & H. L. Ballard (Eds.), *Citizen science for coastal and marine conservation* (pp. 261–278). Routledge. https://doi.org/10.4324/9781315638966-13

Holbrook, J. (2010). Education through science as a motivational innovation for science education for all. Science Education International, 21(2), 80–91. https://files.eric.ed.gov/fulltext/EJ890663.pdf

Holman Jones, S. (2016). Living bodies of thought: The "critical" in critical autoethnography. *Qualitative Inquiry*, *22*(4), 228–237. https://research.monash.edu/en/publications/living-bodies-of-thought-the-critical-in-critical-autoethnography

Hughes, A. (2012). The Folly of Scientism. *New Atlantis (Washington, D.C.)*, *37*, 32–50. https://www.thenewatlantis.com/publications/the-folly-of-scientism

Hughes, J. R., & Callas, P. W. (2011). Is delaying a quit attempt associated with less success? *Nicotine & Tobacco Research*, *13*(12), 1228-1232.

Huntington, H. P. (2011). The local perspective. *Nature*, *478*(7368), 182–183. https://doi.org/10.1038/478182a

Hussain, R, Maple, M, Hunter, S. V., Mapedzahama, V., & Reddy, P. (2015). The Fly-in Fly-out and Drive-in Drive-out model of health care service provision for rural and remote Australia: benefits and disadvantages. *Rural and Remote Health*, *15*(3), 3068–3068. http://hdl.handle.net/1959.13/1331396

International Council for Science. (2002) *ICSU Series on Science for Sustainable Development No. 4: Science*. 24 pp. https://council.science/wp-content/uploads/2017/05/Rainbow-series-Vol11.pdf

Jackson-Barrett, E., Price, A., Stomski, N., & Walker, B. F. (2015). Grounded in country: Perspectives on working within, alongside and for Aboriginal communities. *Issues in Educational Research*, *25*(1), 36-49.

Jegede, O. J. (1995). Collateral Learning and the Eco-Cultural Paradigm in Science and Mathematics Education in Africa. *Studies in Science Education*, *25*(1), 97–137. https://doi.org/10.1080/03057269508560051

Jegede, O., & Aikenhead, G. (1999) Transcending Cultural Borders: implications for science teaching, Research in Science & Technological Education, *17*(1), 45–66. https://doi.org/10.1080/0263514990170104

Jennings, W., Spurling, G. K., Askew, D. A. (2013). Yarning about health checks: barriers and enablers in an urban Aboriginal medical service. *Australian Journal of Primary Health*. https://doi.org/10.1071/PY12138

Jogie (2015) Too pale and stale: prescribed texts used for teaching culturally diverse students in Australia and England, Oxford Review of Education, *41*(3), 287–309, https://doi.org/10.1080/03054985.2015.1009826

Johnson, G., & Dempster, N. (Eds.). (2016). *Leadership in diverse learning contexts (Vol. 22).* Springer. https://www.worldcat.org/title/leadership-in-diverse-learning-contexts/oclc/950922862

Johnson, J. T., Howitt, R., Cajete, G., Berkes, F., Louis, R. P., & Kliskey, A. (2016). Weaving Indigenous and sustainability sciences to diversify our methods. Sustainability Science, 11, 1–11. doi:10.1007/ s11625-015-0349-x

Johnson, K. A., Hill, E. D., & Cohen, A. B. (2011). Integrating the Study of Culture and Religion: Toward a Psychology of Worldview. *Social and Personality Psychology Compass*, *5*(3), 137–152. https://doi.org/10.1111/j.1751-9004.2010.00339.x

Johnson, M. (2013) *NOONGAR DANDJOO: A Cross-Cultural Collaborative Approach to Aboriginal Community Television Production*. [Thesis. Murdoch University, WA].

Jones, S. 2005. *Handbook of Qualitative Research*, 3rd ed. (ed) N. K. Denzin and Y. S. Lincoln (763-92). Thousand Oaks, CA: Sage.

Jones, S. L. H., Adams, T., & Ellis, C. (2013). Introduction: Coming to know autoethnography as more than a method. In S. H. Jones, T. E. Adams, & C. Ellis (Eds.), Handbook of Autoethnography (pp. 17–47). Left Coast Press, Inc.

Kawulich, B. B. (2011). Gatekeeping: An Ongoing Adventure in Research. *Field Methods*, *23*(1), 57–76. https://doi.org/10.1177/1525822X10383388

Keating, J. F. (1997). Harvesting cultural knowledge. *The Science Teacher*, *64*(2), 22. https://www.jstor.org/stable/i24152085

Kelly, S. (2020). Navigating the Western Academy: An Aboriginal Man's PhD Perspective. *The Australian Journal of Indigenous Education*, *49*(1), 23–31. https://doi.org/10.1017/jie.2018.21

Kenny, A. (2013). *The Aranda's Pepa: An introduction to Carl Strehlow's Masterpiece Die Aranda-und Loritja-Stämme in Zentral-Australien (1907-1920)*. ANU Press. https://press.anu.edu.au/publications/arandas-pepa

Kien, G. (2013). The Nature of Epiphany. *International Review of Qualitative Research*, *6*(4), 578–584. https://doi.org/10.1525/irqr.2013.6.4.578

Kim, E., & Dionne, L. (2014). Traditional Ecological Knowledge in Science Education and Its Integration in Grades 7 and 8 Canadian Science Curriculum Documents. *Canadian Journal of Science, Mathematics and Technology Education*, *14*(4), 311–329. https://doi.org/10.1080/14926156.2014.970906

Kingsley, J., Munro-Harrison, E., Jenkins, A., & Thorpe, A. (2021). Developing a framework identifying the outcomes, principles and enablers of 'gathering places': Perspectives from Aboriginal people in Victoria, Australia. *Social Science & Medicine*, *283*, 114217.b https://10.1016/j.socscimed.2021.114217

Klenowski, V. (2009). Australian Indigenous students: addressing equity issues in assessment. *Teaching Education (Columbia, S.C.)*, *20*(1), 77–93. https://doi.org/10.1080/10476210802681741

Koo, L., Trokanas, N., & Cecelja, F. (2017). A semantic framework for enabling model integration for biorefining. *Computers & Chemical Engineering*, *100*, 219–231. https://www.repository.cam.ac.uk/handle/1810/263890

Krummheuer, G. (1995). The ethnography of argumentation. In P. Cobb & H. Bauersfeld (Eds.), *The emergence of mathematical meaning: Interaction in classroom cultures* (pp. 229−269). Lawrence Erlbaum.

Kuiper, J. (1998). Science and Culture: The Art of Balancing. *Journal of the Southern African Association for Research in Mathematics. Science and Technology Education*, *2*(1), 21–32, https://doi.org/10.1080/10288457.1998.10756096

Kwofie, S., & Ogunniyi, M. (2011). Using food science concepts to enact science-Indigenous knowledge systems classroom-based discourses. In *Proceedings of the 19th Annual meeting of the Southern African Association for Research in Mathematics, Science and Technology (SAARMSTE)* (pp. 387–397). https://eric.ed.gov/?q=bi&ff1=locSouth+Africa&id=ED520414

Lapadat, Judith C. (2017). Ethics in Autoethnography and Collaborative Autoethnography. *Qualitative Inquiry*, *23*(8), 589–603. https://doi.org/10.1177/1077800417704462

Laycock, A. F., Walker, D., Harrison, N., & Brands, J. (2011) *Researching Indigenous Health: A Practical Guide for Researchers*, The Lowitja Institute. https://www.lowitja.org.au/content/Document/Lowitja-Publishing/Researchers-Guide_0.pdf

Le Roux, C. S. (2017). Exploring rigour in autoethnographic research. *International Journal of Social Research Methodology*, *20*(2), 195–207. https://doi.org/10.1080/13645579.2016.1140965

Leach, M., & Fairhead, J. (2002), Manners of contestation: “citizen science” and “Indigenous knowledge” in West Africa and the Caribbean. *International Social Science Journal*, *54*, 299–311. https://doi.org/10.1111/1468-2451.00383

Leeson, S. et al. (2016). Yarning and appreciative inquiry: The use of culturally appropriate and respectful research methods when working with Aboriginal and Torres Strait Islander women in Australian prisons. *Methodological Innovations*, *9*, 205979911663066. https://doi.org/10.1177/2059799116630660

Lehtiniemi, M., Outinen, O., & Puntila-Dodd, R. (2020). Citizen science provides added value in the monitoring for coastal non-indigenous species. *Journal of Environmental Management*, *267*, 110608–110608. https://doi.org/10.1016/j.jenvman.2020.110608

Leidner, D., Alavi, M., & Kayworth, T. (2006). The Role of Culture in Knowledge Management: A Case Study of Two Global Firms. *International Journal of e-Collaboration*, *2*(1), 17–40. https://doi.org/10.4018/jec.2006010102

Leitao, Selma. (2000). The Potential of Argument in Knowledge Building. *Human Development*, *43*(6), 332–360. https://doi.org/10.1159/000022695

Leonard, S., Parsons, M., Olawsky, K., & Kofod, F. (2013). The role of culture and traditional knowledge in climate change adaptation: Insights from East Kimberley, Australia. *Global Environmental Change*, *23*(3), 623–632. https://doi.org/10.1016/j.gloenvcha.2013.02.012

Lovett, G. M., Burns, D. A., Driscoll, C. T., Jenkins, J. C., Mitchell, M. J., Rustad, L., Shanley, J. B., Likens, G. E. & Haeuber, R. (2007). Who needs environmental monitoring? *Frontiers in Ecology and the Environment*, *5*(5), 253–260. https://doi.org/10.1890/1540-9295(2007)5[253:WNEM]2.0.CO;2

Lyons, T. (2006). Choosing physical science courses: The importance of cultural and social capital in the enrolment decisions of high achieving students. *Science and technology education for a diverse world: dilemmas, needs and partnerships*, 369–384. https://eprints.qut.edu.au/92906/

Ma Rhea, Z. M. (2015). *Leading and Managing Indigenous Education in the Postcolonial World*. Routledge. https://doi.org/10.4324/9780203796344

Ma Rhea, Z., & Atkinson, H. L. (2012). Growing understanding: Issues in mainstream education in Indigenous and traditional communities. In P. Ahluwalia, S. Atkinson, P. Bishop, P. Christie, R. Hattam, & J. Matthews (Eds.), *Reconciliation and Pedagogy* (pp. 155–172). Routledge.

Magerman, R. C. (2011). *Effects of an argumentation-based instruction on grade 10 learners' understanding of the causes of pollution at a river site* (Doctoral dissertation, University of the Western Cape). https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.970.2388&rep=rep1&type=pdf

Manathunga, C. (2009). Research as an intercultural 'contact zone'. *Discourse: Studies in the Cultural politics of Education*, *30*(2), 165–177. http://dx.doi.org/10.1080/01596300902809161

Manzini, S. (2000). Learners' Attitudes Towards the Teaching of Indigenous African Science as Part of the School Science Curriculum. *African Journal of Research in Mathematics, Science and Technology Education*, *4*(1), 19–32 http://dx.doi.org/10.1080/10288457.2000.10756116

Maréchal, G. (2010). Autoethnography. In A. Mills, G. Durepo, & E. Wiebe (Eds.), *Encyclopedia of case study research* vol. 2 (pp. 43–45). SAGE. https://doi.org/10.4135/9781412957397.n19

Marker, M. (2015). Indigenous knowledge, Indigenous scholars, and narrating scientific selves: "to produce a human being". *Cultural Studies of Science Education*, 11, 477–480 https://doi.org/10.1007/s11422-015-9660-1

Martin, K. (2008). The intersection of Aboriginal knowledges, Aboriginal literacies, and new learning pedagogy for Aboriginal students. *Multiliteracies and diversity in education: New pedagogies for expanding landscapes*, 58–81. http://library.deakin.edu.au/record=b2342351~S1

Matemba, Y. & Lilemba, J. (2015) Challenging the Status Quo: Reclaiming Indigenous Knowledge through Namibia's Postcolonial Education System. *Diaspora, Indigenous, and Minority Education*, *9*(3), 159–174, https://doi.org/10.1080/15595692.2014.997382

Maxfield, M. G., & Babbie, E. R. (2014). *Research methods for criminal justice and criminology*. Cengage Learning. https://www.cengage.com/c/research-methods-for-criminal-justice-and-criminology-7e-maxfield/9781285067841

Maydell, E. (2010). Methodological and analytical dilemmas in autoethnographic research. *Journal of Research Practice*, *6*(1), Article M5. http://jrp.icaap.org/index.php/jrp/article/view/223/190

McConney, A. et al. (2011). Bridging the Gap? A Comparative, Retrospective Analysis of Science Literacy and Interest in Science for Indigenous and Non-Indigenous

Australian Students. *International Journal of Science Education*, *33*(14), 2017–2035. http://dx.doi.org/10.1080/09500693.2010.529477

McGregor, D. (2012). Reviewing Bridging Cultures: Indigenous and Scientific Ways of Knowing Nature. *Canadian Journal of Science, Mathematics and Technology Education*, *12*(3), 302–310. https://doi.org/10.1080/14926156.2012.690064

McKemey, M. B., Reid, N., Ens, E., Hunter, J., & Ridges, M. (2021). Developing cross-cultural knowledge ('right way' science) to support Indigenous cultural fire management. *Austral Ecology*, *46*(7), 1011–1029. https://doi.org/10.1111/aec.13034

McKinley, Elizabeth. (2005). Locating the global: culture, language and science education for Indigenous students. *International Journal of Science Education*, *27*(2), 227–241. https://doi.org/10.1080/0950069042000325861

McMahon, J. et al. (2012) 'Body practices—exposure and effect of a sporting culture?' Stories from three Australian Swimmers. *Sport, Education and Society*, *17*(2), 181–206, http://dx.doi.org/10.1080/13573322.2011.607949

McMahon, J., & Dinan Thompson, M. (2008). A malleable body: Revelations from an elite Australian swimmer. *ACHPER Australia healthy lifestyles journal*, *55*(1), 23–28.

McMillan, B. (2013). Inuit Legends, Oral Histories, Art, and Science in the Collaborative Development of Lessons that Foster Two-Way Learning: The Return of the Sun in Nunavut. *Interchange (Toronto. 1984)*, *43*(2), 129–145. https://doi.org/10.1007/s10780-013-9189-8

McNair, M. et al. (2012). Continuities in education: Pedagogical perspectives and the role of Elders in education for Indigenous students. *Journal of Australian Indigenous Issues*, *15*(1), 20–39.

Michel, H. & Gayton, D. (2002). Linking Indigenous peoples' knowledge and Western science in natural resource management: A dialogue. *Journal of Ecosystems and Management.* https://jem-online.org/index.php/jem/article/view/226

Michie, M. (2002). Why Indigenous science should be included in the school science curriculum. *Australian Science Teachers Journal*, *48*(2), 36–40. https://search.informit.org/doi/10.3316/aeipt.119845

Michie, M. (2014) Working cross-culturally. Identity Learning, Border crossing and Culture Brokering, Sense Publishers

Miller, T., & Bell, L. (2002). Consenting to what? Issues of access, gate-keeping and 'informed'consent. *Ethics in qualitative research*, 53–69. https://www.academia.edu/21021738/Consenting_to_what_issues_of_access_gate_keeping_and_informed_consent_2nd_ed

Mills, J., Bonner, A., & Francis, K. (2006). The Development of Constructivist Grounded Theory. *International Journal of Qualitative Methods*, *5*(1), 25–35. https://doi.org/10.1177/160940690600500103

Moje, E. B., Ciechanowski, K. M., Kramer, K., Ellis, L., Carrillo, R., & Collazo, T. (2004). Working toward third space in content area literacy: An examination of everyday funds of knowledge and discourse. *Reading research quarterly*, *39*(1), 38–70. https://www.jstor.org/stable/4151759

Monhardt, R. (2003). The Image of the Scientist Through the Eyes of Navajo Children. *Journal of American Indian Education*, *42*(3), 25–39. https://jaie.asu.edu/sites/default/files/423_2003_2_monhardt.pdf

Morales, M. E. (2015). Influence of culture and language sensitive physics on science attitude enhancement. *Cultural Studies of Science Education*, *10*(4), 951–984. https://doi.org/10.1007/s11422-015-9669-5

Moynihan, R. (2016, May 28). The 'replication crisis' across science. *The Saturday Paper*. https://www.thesaturdaypaper.com.au/2016/05/28/the-replication-crisis-across-science/14643576003283

Moyo, P. V., & Kizito, R. (2014). Prospects and challenges of using the argumentation instructional method to indigenise school science teaching. *African Journal of Research in Mathematics, Science and Technology Education*, *18*(2), 113–124. https://doi.org/10.1080/10288457.2014.912831

Mutonyi, H. (2016). Stories, proverbs, and anecdotes as scaffolds for learning science concepts. *Journal of Research in Science Teaching*, *53*, 943–971. https://doi.org/10.1002/tea.21255.

National Health and Medical Research Council. (2018a). *Ethical Conduct in Research With Aboriginal and Torres Strait Islander Peoples and Communities (NHMRC): Guidelines for Researchers and Stakeholders. Canberra: Commonwealth of Australia*. https://www.nhmrc.gov.au/about-us/resources/ethical-conduct-research-aboriginal-and-torres-strait-islander-peoples-and-communities

Neimeyer, R. A., Levitt, H., & Snyder, C. (2001). Coping and coherence: A narrative perspective on resilience. In C. R. Snyder (Ed.), *Coping with stress: Effective people*

and processes, (pp. 47–67). Oxford University Press. https://psycnet.apa.org/record/2001-01482-003

Ninnes, P. (2000). Representations of Indigenous knowledges in secondary school science textbooks in Australia and Canada. *International Journal of Science Education*, *22*(6), 603–617. https://doi.org/10.1080/095006900289697

Ninnes, P. (2001). Representations of Ways of Knowing in Junior High School Science Texts Used in Australia. *Discourse (Abingdon, England)*, *22*(1), 81–94. https://doi.org/10.1080/01596300120039777

Ninnes, P. (2004) Discourses of Cultural Diversity in the Science Curriculum: Connections, contradictions, and colonialisms. *Discourse: Studies in the Cultural Politics of Education*, *25*(2), 261–278. https://doi.org/10.1080/01596300410001692175

Noonan, J. (2008). Ontology. In L. M. Given (Ed.), *The Sage encyclopedia of qualitative research methods*, 2, (pp. 577–581). http://dx.doi.org/10.4135/9781412963909.n298

Noy, N. F., & McGuinness, D. L. (2001). *Ontology development 101: A guide to creating your first ontology*. https://protege.stanford.edu/publications/ontology_development/ontology101.pdf

O'Connell, N. P. (2017). Teaching Irish Sign Language in Contact Zones: An Autoethnography. *The Qualitative Report*, *22*(3), 849–867. https://doi.org/10.46743/2160-3715/2017.2511

OECD. (2007). *PISA 2006: Science Competencies for Tomorrow's World: Volume 1: Analysis*, PISA, OECD Publishing. https://doi.org/10.1787/9789264040014-en

Ogawa, M. (1999, February). Science as the Culture of Scientist: How to Cope with Scientism? In *preconference workshop of annual meeting of the National Association for Research in Science Teaching, Boston, MA.* https://www.researchgate.net/profile/Masakata-Ogawa2/publication/279512785_Science_as_the_culture_of_scientists/links/5593f44c08ae5af2b0ecdb70/Science-as-the-culture-of-scientists.pdf

Ogunniyi, M. B. (1996). Science, technology and mathematics: The problem of developing critical human capital in Africa. *International Journal of Science Education*, *18*(3), 267–284. https://www.tandfonline.com/doi/abs/10.1080/0950069960180301

Ogunniyi, M. B. (2000). Teachers' and pupils' scientific and indigenous knowledge of natural phenomena. *Journal of the Southern African Association for Research in Mathematics, Science and Technology Education*, *4*(1), 70–77. https://www.tandfonline.com/doi/abs/10.1080/10288457.2000.10756120

Ogunniyi, M. B. (2004). The challenge of preparing and equipping science teachers in higher education to integrate scientific and Indigenous knowledge systems for learners: the practice of higher education. South African Journal of Higher Education, *18*(3), 289–304. https://journals.co.za/doi/pdf/10.10520/EJC37088

Ogunniyi, M. B. (2007). Contiguity Argumentation Theory and Educators' Conceptions of the Nature. *SAARMSTE EXECUTIVE*, 102. https://www.saarmste.org/images/Conference_Proceedings/SAARMSTE2007-Eduardo_Mondlane_Univ/Ogunniyi_MB_1.pdf

Ogunniyi, M. B. (2007). Teachers' Stances and Practical Arguments Regarding a Science-Indigenous Knowledge Curriculum: Part 1. *International Journal of Science Education*, *29*(8), 963–986. https://doi.org/10.1080/09500690600931020

Ogunniyi, M. B. (2015). Empowering Socioeconomic Development Efforts in Africa through the Indigenization of Science, Mathematics and Technology Education. *The Southern African Association for Research in mathematics, Science and Technology Education (SAARMSTE), 1*, 20–35.

Ogunniyi, M. B., & Hewson, M. G. (2008). Effect of an argumentation-based course on teachers' disposition towards a science-indigenous knowledge curriculum. *International Journal of Environmental and Science Education*, *3*(4), 159–177. https://doi.org/10.1007/s11422-010-9303-5

Okkonen, J., Vuori, V., & Helander, N. (2018). Enablers and restraints of knowledge work - Implications by certain professions? *Cogent Business & Management*, *5*(1), 1504408. https://doi.org/10.1080/23311975.2018.1504408

Okumus, S., & Unal, S. (2012). The effects of argumentation model on students' achievement and argumentation skills in science. *Procedia-Social and Behavioural Sciences*, *46*, 457–461. https://www.sciencedirect.com/science/article/pii/S1877042812012700

Osmond, G. & Phillips, M. G. (2018). Indigenous Women's Sporting Experiences: Agency, Resistance and Nostalgia. *The Australian Journal of Politics and History*, *64*(4), 561–575. https://doi.org/10.1111/ajph.12516

Pace, S. (2012). *Writing the self into research: using grounded theory analytic strategies in autoethnography*. [CQUniversity. Journal contribution]. https://hdl.handle.net/10018/927903

Peterson, T. O., & Beard, J. W. (2004). Workspace technology's impact on individual privacy and team interaction. *Team Performance Management*, *10*(7/8), 163–172. https://doi.org/10.1108/13527590410569887

Piliouras, P. & Evangelou, O. (2010). Teachers' Inclusive Strategies to Accommodate 5th Grade Pupils' Crossing of Cultural Borders in Two Greek Multicultural Science Classrooms. *Research in Science Education (Australasian Science Education Research Association)*, *42*(2), 329–351. https://doi.org/10.1007/s11165-010-9198-x

Popper, K. R. (1959). *The Logic of Scientific Discovery*. University Press.

Power, A., Bartleet, B. L., & Bennett, D. 2018). Transforming Lives: Exploring Eight Ways of Learning in Arts-based Service Learning with Australian Aboriginal Communities. In *Community Music in Oceania* (pp. 153–176). University of Hawaii Press. https://doi.org/10.21313/9780824867034-011

Power, K. (2004). Yarning - a responsive research methodology. *Journal of Australian Research in Early Childhood Education*, *11*(1), 37–46. http://arrow.monash.edu.au/hdl/1959.1/159762

Pratt, M. L. (1991). Arts of the contact zone. *Profession*, 33–40. Modern Language Association Publishers.

Rasmussen, C., & Stephan, M. (2014). A Methodology for Documenting Collective Activity. In A. Kelly, R. Lesh, & J. Baek (Eds.), *Handbook of Design Research Methods in Education* (pp. 213-234). Routledge.

Rasmussen, M., Guo, X., Wang, Y., Lohmueller, K. E., Rasmussen, S., Albrechtsen, A., ... Willerslev, E. (2011). An Aboriginal Australian genome reveals separate human dispersals into Asia. *Science*, *334*(6052), 94–98. https://doi.org/10.1126/science.1211177

Reed-Danahay, D. (2017). Bourdieu and critical autoethnography: Implications for research, writing, and teaching. *International Journal of Multicultural Education*, *19*(1), 144-154. https://doi.org/10.18251/ijme.v19i1.1368

Reilly, L., & Rees, S. (2018). Fatherhood in Australian Aboriginal and Torres Strait Islander communities: An examination of barriers and opportunities to strengthen the male parenting role. *American Journal of Men's Health*, *12*(2), 420–430. https://doi.org/10.1177/1557988317735928

Rhea, Z. M., Anderson, P. J., & Atkinson, B. (2017): *Final report: improving teaching in Aboriginal and Torres Strait Islander education: National professional standards for teachers: Standards focus areas 1.4 and 2.4*. https://doi.org/10.4225/03/5a150377c5064

Rheault, H., Coyer, F., & Bonner, A. (2021). Time to listen: Chronic disease yarning with Aboriginal and Torres Strait Islander peoples living in remote Australia. *Collegian (Royal College of Nursing, Australia)*, *28*(1), 10–17. https://doi.org/10.1016/j.colegn.2020.06.001

Rioux, J., Ewing, B., & Cooper, T. J. (2018). Embedding Aboriginal Perspectives and Knowledge in the Biology Curriculum: The Little Porky. *The Australian Journal of Indigenous Education*, *47*(2), 158–170. https://doi.org/10.1017/jie.2017.12

Roberts, C., & Mackenzie, A. (2006). Science. *Theory, Culture & Society.*, *23*(2–3), 157–163. https://doi.org/10.1177/0263276406063781

Romero, F. (2019). Philosophy of science and the replicability crisis. *Philosophy Compass*, *14*(11) https://doi.org/10.1111/phc3.12633

Rose, D. & Read, T. (2001). The Kormilda science project-the earth sciences with an Australian Indigenous perspective. *Australian Science Teachers Journal*, *47*(2), 44.

Rothman, J. (2014). The meaning of culture. *The New Yorker*, *26*. https://www.newyorker.com/books/joshua-rothman/meaning-culture

Rumbold, A.R., Cunningham, J. A. (2008). Review of the Impact of Antenatal Care for Australian Indigenous Women and Attempts to Strengthen these Services. *Maternal and Child Health* Journal 12(1), 83–100 https://doi.org/10.1007/s10995-007-0216-1

Russell, S. T. (2015). Human developmental science for social justice. *Research in Human Development*, *12*(3–4), 274–279. https://doi.org/10.1080/15427609.2015.1068049

Ryan, A. (2008). Indigenous knowledge in the science curriculum: avoiding neo-colonialism. *Cultural Studies of Science Education*, *3*, 663–702. https://doi-org.ezproxy.lib.monash.edu.au/10.1007/s11422-007-9087-4

Sable, P. (1992). Attachment theory: Application to clinical practice with adults. *Clinical Social Work Journal 20*, 271–283. https://doi.org/10.1007/BF00754639

Saldaña, J. (2012). *The coding manual for qualitative researchers*. (2nd Edition). Thousand Oakes, CA: Sage.

Schim, S. M., Doorenbos, A., Benkert, R., & Miller, June. (2007). Culturally Congruent Care. *Journal of Transcultural Nursing*, *18*(2), 103–110. https://doi.org/10.1177/1043659606298613

Schooler, Jonathan W. (2014). Metascience could rescue the 'replication crisis' *Nature (London)*, *515*(7525), 9–9. https://doi.org/10.1038/515009a

Schorch, P. (2015). Contact Zones, Third Spaces, and the Act of Interpretation. *Museum and Society*, *11*(1), 68–81. https://journals.le.ac.uk/ojs1/index.php/mas/article/view/223

Shay, M. (2016). Seeking new paradigms in aboriginal education research: methodological opportunities, challenges and aspirations. *Social and Education History 5*(3), 273–296. http://dx.doi.org/10.17583/hse.2016.2299

Smith, G., & Michie, M. (2019). Towards an understanding of Indigenous perspectives through the eyes of pre-service science education students. *Learning Communities: International Journal of Learning in Social Contexts*, *24*, 22-39. https://doi.org/10.18793/lcj2019.24.03

Snively, G., & Corsiglia, J. (2001). Discovering Indigenous science: Implications for science education. *Science Education (Salem, Mass.)*, *85*(1), 6–34. https://doi.org/10.1002/1098-237X(200101)85:1<6::AID-SCE3>3.0.CO;2-R

Somerville, M., & Perkins, Tony. (2010). *Singing the coast: place and identity in Australia*. Aboriginal Studies Press.

Sparkes, A. C. (2004). From performance to impairment: a patchwork of embodied memories. In J. Evans, B. Davies & J. Wright (Eds.), *Body knowledge and control: studies in the sociology of physical education and health* (pp. 140–155). Routledge.

Stahlke Wall, S. (2016). Toward a Moderate Autoethnography. *International Journal of Qualitative Methods*, *15*(1), 160940691667496. https://doi.org/10.1177/1609406916674966

Stein, J. (2016). Using the stages of team development. *HR at MIT| Learning and Development*. https://hr.mit.edu/learning-topics/teams/articles/stages-development

Stephens, S. (2003). Handbook for culturally-responsive science curriculum. *Alaska Native Knowledge Network*. http://www.ankn.uaf.edu.

Stevens, M., Vitos, M., Altenbuchner, J., Conquest, G., Lewis, J., & Haklay, M. (2014). Taking Participatory Citizen Science to Extremes. *IEEE Pervasive Computing*, *13*(2), 20–29. https://doi.org/10.1109/MPRV.2014.37

Sveiby, K. E., & Simons, R. (2002). Collaborative climate and effectiveness of knowledge work–an empirical study. *Journal of knowledge Management*. *6*(5), 420–433. https://doi.org/10.1108/13673270210450388

Taylor, M. et al. (2014) Tensions of Reimagining Our Roles as Teacher Educators in a Third Space: Revisiting a Co/autoethnography Through a Faculty Lens. *Studying Teacher Education*, *10*(1), 3–19. https://doi.org/10.1080/17425964.2013.866549

Tedlock, B. (2016). Introduction: Braiding evocative with analytic autoethnography. In S. Holman., T. Adams, C. Ellis (Eds.), *Handbook of autoethnography*, (pp. 358–510). Routledge.

Tengö, M., Austin, B. J., Danielsen, F., & Fernández-Llamazares, Á. (2021). Creating synergies between citizen science and Indigenous and local knowledge. *BioScience*, *71*(5), 503–518. https://doi.org/10.1093/biosci/biab023

The Australian Curriculum (2015). *Home - The Australian Curriculum v7.3*. [online] Australiancurriculum.edu.au. http://www.australiancurriculum.edu.au

Thomas, P. Y. (2010). Research methodology and design. Research methodology and design, 291–334. https://uir.unisa.ac.za/bitstream/handle/10500/4245/05Chap%204_Research%20methodology%20and%20design.pdf

Thorpe, K., Burgess, C., & Egan, S. (2021). Aboriginal community-led preservice teacher education: Learning from country in the city. *Australian Journal of Teacher Education (Online)*, *46*(1), 55–73. https://ro.ecu.edu.au/ajte/vol46/iss1/4/

Tilley-Lubbs, G. A. (2018). Freire in a Changing World: Critical Autoethnography Meets Freire. *International Review of Qualitative Research*, *11*(1), 11–21. https://doi.org/10.1525/irqr.2018.11.1.11

Todd, H. J. (2018). The Third Space: Shared Understanding between Aboriginal and Non-Aboriginal People (Doctoral dissertation, Curtin University).

Tolbert, S., Barton, A. C., & Moll, L. C. (2018). What can teachers do to restructure power dynamics in science classrooms? Exploring the personal and social transformative power of science learning through a funds of knowledge approach. LA Bryan & K. Tobin (Eds.), *13*, 51–68. https://www.academia.edu/31098543/What_can_teachers_do_to_restructure_power_d

ynamics_in_science_classrooms_Exploring_the_personal_and_social_transformative_power_of_science_learning_through_a_funds_of_knowledge_approach

Tonkin, E., Pfeiffer, H. D., & Hewson, A. (2010, March). *An evidence-based approach to collaborative ontology development* [Poster presentation] WMM Workshop: Automated Development, Evolution, and Interpretation of Ontologies, Part of AISB'10 Convention. https://researchportal.bath.ac.uk/en/publications/anevidence-basedapproachtocollaborativeontologydevelopment

Toulmin, S. (1969). *The uses of arguments.* Cambridge University Press

Tuckman, B. W. (1965). Developmental sequence in small groups. *Psychological Bulletin*, *63*(6), 384–399. https://doi.org/10.1037/h0022100

Tylor, E. B. (1871). Primitive culture: Researches into the development of mythology, philosophy, religion, art and custom (Vol. 2). J. Murray.

Veintie, T. (2013). Practical learning and epistemological border crossings: Drawing on indigenous knowledge in terms of educational practices. *Diaspora, Indigenous, and Minority Education*, *7*(4), 243–258. https://www.tandfonline.com/doi/abs/10.1080/15595692.2013.827115

Vickers, P. (2007). Ayaawx: In the path of our ancestors. *Cultural Studies of Science Education*, *2*(3). https://dspace.library.uvic.ca:8443/handle/1828/1299?show=full

Victoria Department of Health Victorian health priorities framework 2012–2022: Rural and Regional health plan Department of Health, Strategy and Policy, Melbourne (2011) http://www.health.vic.gov.au/healthplan2022

Vindrola-Padros, C., Pape, T., Utley, M., & Fulop, N. J. (2017). The role of embedded research in quality improvement: a narrative review. BMJ Quality & Safety, *26*(1), 70–80. https://doi.org/10.1136/bmjqs-2015-004877

Wagner, R. (2005). Partnerships and collaborations as paucity management practices in rural and regional community-based human service organisations. *Third Sector Review*, *11*(1). https://doi.org/10.3316/ielapa.200506567

Walker, K. (2004). Teachers and Teacher World-views. *International Education Journal*, *5*(3), 433–438. https://files.eric.ed.gov/fulltext/EJ903868.pdf

Walker, M., Fredericks, B., Mills, K., & Anderson, D. (2014) "Yarning" as a Method for Community-Based Health Research With Indigenous Women: The Indigenous Women's Wellness Research Program. Health Care for Women International, *35*(10), 1216–1226. https://doi.org/10.1080/07399332.2013.815754

Walsh, F., Dobson, P., & Douglas, J. (2013). Anpernirrentye: a Framework for Enhanced Application of Indigenous Ecological Knowledge in Natural Resource Management. *Ecology and Society*, *18*(3), 18. https://doi.org/10.5751/ES-05501-180318

Wang, C. C. D., & Mallinckrodt, B. (2006). Acculturation, attachment, and psychosocial adjustment of Chinese/Taiwanese international students. *Journal of Counselling Psychology*, *53*(4), 422–433. https://doi.org/10.1037/0022-0167.53.4.422

Wang, D. (2015). Activating cross-border brokerage: Interorganizational knowledge transfer through skilled return migration. *Administrative Science Quarterly*, *60*(1), 133-176. https://doi.org/10.1177/0001839214551943

Weber, K., Maher, C., Powell, A., & Lee, H. S. (2008). Learning Opportunities from Group Discussions: Warrants Become the Objects of Debate. *Educational Studies in Mathematics*, *68*(3), 247–261. https://doi.org/10.1007/s10649-008-9114-8

White, J. & Fitzgerald, T. (2010) Researcher tales and research ethics: the spaces in which we find ourselves. *International Journal of Research & Method in Education*, *33*(3), 273–285, https://doi.org/10.1080/1743727X.2010.511711

Wilder, B. T., O'meara, C., Monti, L., & Nabhan, G. P. (2016). The importance of Indigenous knowledge in curbing the loss of language and biodiversity. *BioScience*, *66*(6), 499–509. https://doi.org/10.1093/biosci/biw026

Williams, J. P., & Jauhari bin Zaini, M. K. (2016). Rude Boy Subculture, Critical Pedagogy, and the Collaborative Construction of an Analytic and Evocative Autoethnography. *Journal of Contemporary Ethnography*, *45*(1), 34–59. https://doi.org/10.1177/0891241614549835

Wilson, W. A. (2016). Scientific regress. *First Things*, (263), 37. www.firstthings.com/article/2016/05/scientific-regress.

Winkler, I. (2018). Doing autoethnography: Facing challenges, taking choices, accepting responsibilities. *Qualitative Inquiry*, *24*(4), 236–247. https://journals.sagepub.com/doi/abs/10.1177/1077800417728956

Wunungmurra, W. (1989). "Dhawurrpunaramirri": Finding the common ground for a new aboriginal curriculum. *Ngoonjook*, *2*, 12–16. https://search.informit.org/doi/10.3316/ielapa.152010335539271

Zipin, L., Sellar, S., Brennan, M., & Gale, T. (2015) Educating for Futures in Marginalized Regions: A sociological framework for rethinking and researching aspirations. *Educational Philosophy and Theory*, *47*(3), 227–246. http://dx.doi.org/10.1080/00131857.2013.839376