"What is the thinking child doing and what is the doing child thinking?" Exploring teacher perspectives on schema learning to identify children's working theories within current teaching practices

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“What is the thinking child doing and, what is the doing child thinking?”

Exploring teacher perspectives on schema learning to identify children's working theories within current teaching practices

An Aotearoa, New Zealand Study

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2019-205E/2020-235H, 1 January 2020 & 16th March 2021, Australian Catholic University Research Ethics Committee;

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Meredith Kelly *Meredith Kelly* 30 June 2024

Abstract

Aotearoa New Zealand's early childhood education has a long and proud history of innovative curriculum and contemporary pedagogical approaches in teaching and learning. The Aotearoa, New Zealand early childhood curriculum *Te Whāriki* (Ministry of Education, 1996, 2017) values children's learning dispositions[1] and working theories[2] for building a foundation of knowledge, skills and attitudes, critical for formal and lifelong learning.

This research focused on the perspectives of teacher participants in identifying and responding to children's learning through a particular lens. The current empirical literature that was reviewed at the outset of the study demonstrated that early childhood teachers in Aotearoa, New Zealand have struggled to identify children's thinking as 'working theories' in their existing teaching practices (Hedges & Jones, 2012; Lovett, 2014). Therefore, the aim of this research was to investigate teachers' perspectives on how they identify children's thinking (as working theories) with the addition of 'schema learning theory' (Athey, 2007) alongside their current approaches. A qualitative and interpretive research project was adopted to explore teachers' perspectives on schema learning theory to identify and explore children's working theories.

This study drew on a symbolic interactionist theoretical framework (Mead, 1934; Blumer, 1969) to ensure participants were able to make personal, professional and collaborative meaning as they explored the possibilities in the project. The methodological framework of symbolic interactionism

[1] Many dispositions have been identified as valuable for supporting lifelong learning; these are termed learning dispositions. Learning dispositions associated with Te Whāriki include: courage and curiosity (taking an interest), trust and playfulness (being involved), perseverance (persisting with difficulty, challenge and uncertainty), confidence (expressing a point of view or feeling) and responsibility (taking responsibility) (p.23).

[2] Working theories are the evolving ideas and understandings that children develop as they use their existing knowledge to try to make sense of new experiences (p. 23)

created opportunities for probing the participants perspectives, insights, and inquiries to enable their exploration of schema learning theory alongside their understandings of children's working theories. Semi-structured interviews, group and individual reflections and journaling were the preferred methods that shaped the data collection and analysis. Four key theoretical propositions were generated as the basis of the findings of this study. The findings make a significant contribution for consideration in the broader context of early childhood in Aotearoa New Zealand.

In summary, it can be concluded that through exploring schema learning theory, the participants became more confident to explore children's thinking as working theories in increasingly complex ways. Concurrently they revealed and critiqued deep complexities inherent in their own role as teachers, through re-thinking and re-positioning their existing pedagogical approaches when considering what motivates children's behaviours. Their processes of engagement and reflection, and the concurrent professional enlightenment, strengthened their relationships with children in transformative ways. These key concepts formed the basis of a set of recommendations for the profession, for initial teacher education and Aotearoa, New Zealand's educational policy.

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I would like to thank my amazing lead supervisors on this project, Dr Valerie Margrain, Dr Tonya Rooney, Professor Tania Aspland, Kate Highfield and Melissa Cain. All have supported this journey with unwavering encouragement and commitment. Without any one of them, I would not have completed this project.

Thanks to the amazing teams of kindergarten kaiako, te mana wahine o nga tamariki kohungahunga (women of significance and stature who work with our young children) whom I worked with in this study. I learned as much from you as I hope you did from me.

Many thanks to my family, and to my work colleagues at the University of Otago College of Education who have all been amazing support over the years.

I dedicate this thesis to my father, Don Kelly, whose wish was that I complete this project. This is for him.

Table 3: Glossary of Terms - Common te reo Māori terms used in this research.

Te reo Māori is the language of New Zealand's tangata whenua; the indigenous people of this land. Te reo Māori is widely taught and used in teaching and learning settings in New Zealand.

Māori Kupu/word	Interpretation/meaning in English
Te Whāriki	"The Mat" New Zealand Early Childhood Curriculum
Whānau	Family/extended family
Te ao Māori	A Māori world view
Mahi	Work
Tamariki	Children
Aroha	Love/care/affection
Tuakana Teina	Tuakana - older/more experienced Teina - younger/less experienced
Kaiako	Teacher/educator
Kawa	What happens in this place, i.e. routines, celebrations
Tikanga	How the routines, celebrations happen, reflects iwi Māori
Kaupapa	Focus of inquiry/discussion
Manākitanga	Care for, show hospitality, compassion/empathy
Whānaungatanga	Care for collective as a family/whānau, enact family values
Oranga Tamariki	New Zealand's Social Welfare Organisation
te mana wahine o nga tamariki kohungahunga	The women of significance and statue who work with our young children (in acknowledgements)

Reference

Ministry of Education, (2017). *Te whāriki: He whāriki mātauranga mō ngā mokopuna o Aotearoa: Early childhood curriculum.* Learning Media

Chapter One: Exploring children's working theories through schema and socio-cultural theory approaches to learning

1.1 Introduction

In Aotearoa New Zealand's early childhood education and in the context of this study, the importance of children's thinking is central to a framework for learning. Children's thinking is recognised as 'working theories' in the Aotearoa New Zealand Early Childhood Curriculum "*Te Whāriki*" (Ministry of Education, 2017). While the early childhood sector in Aotearoa New Zealand has regulations for the assessment of children's working theories at a curriculum and policy level, there is little research about 'how' teachers practice identifying children's thinking. Historically, early childhood teachers in Aotearoa New Zealand have struggled to identify children's 'working theories' in their teaching practices (Hedges & Jones, 2012; Lovett, 2014). The problematic nature of teachers' practices working with children's working theories is explored through this research by investigating teachers' perspectives on how they may be able to identify children's thinking, as working theories, through the lens of schema learning theory. The study aimed to explore teachers develop perspectives when exploring schema theory to strengthen their understanding of children's thinking and to identify children's working theories within the current socio-cultural context.

To enable this investigation into the 'thinking child' early childhood teacher's perspectives of identifying children's thinking was explored through the lenses of two theories, specifically, schematic (Athey, 1990, 2007; Meade & Cubey, 2008; Piaget, 1950), and socio-cultural learning theories (Bruner, 1960; Carr, 200; Vygotsky, 1986). Being able to recognise and analyse children's thinking is a means for teachers to be able to bring complexity to understanding and facilitating children's learning. Therefore, investigating teacher perspectives on their own practice was

essential to explore the possibilities of both schema and socio-cultural theories of learning as integral to teachers practices for identifying children's thinking and working theories. The concept of 'working theories' originated from Guy Claxton's' (1990) work on the concept that children develop 'mini theories' of how their world works. As will become evident as this dissertation unfolds, developing working theories is mandated within Aotearoa New Zealand curriculum and pedagogy as a framework for learning alongside the acquisition of learning dispositions (Carr, 2001). This is the context of this study, a priority educational shift in the field of early childhood education.

1.2 Aims of the study

This study held two aims. First, to explore the perspectives of teachers as they learn, inquire, and make meaning from researching how children 'think' through exploring two learning theories and the body of knowledge that underpin such theories. Secondly, to challenge and investigate whether the dominant paradigm held within Aotearoa New Zealand's curriculum that socio-cultural and learning dispositional approaches to children's thinking is, in fact, insufficient on its own. There is an argument that suggests a narrative and dispositional framework of learning is insufficient, that additional teacher knowledge is needed to implement the expectations of 'working theories' equally valued within *Te Whāriki* (Hedges, 2014; Ministry of Education, 2017). Thus, the central research question that shaped this study was:

> "What are teacher's perspectives when exploring schema learning theory to understand children's working theories within their current socio-cultural practices?"

Critical to this thesis was the teacher's responsiveness to potential ways of thinking about children's thinking, therefore a coherent theoretical framework that shaped the epistemological, ontological

and methodological constructs of the study was essential. The research design involved a qualitative and interpretive methodology underpinned by a Symbolic Interactionist theoretical framework (Blumer, 1969). The study required critical analysis of the socio-cultural theories of identifying children's working theories, which teachers were already familiar with (Hedges, 2014), while at the same time, exploring the possibilities of schematic theories in children's thinking alongside this practice. Schema learning theory originated from Jean Piaget (1950) who proposed children actively develop understandings about their world as they participate within it. This work was more recently developed by Chris Athey (1990, 2007) Anne Meade and Pam Cubey (1995, 2008; Cubey, 2008, England, 2018) in particular, in terms of schema identification and will be explored in later chapters as the conceptual framing of the study is outlined and rationalised.

It was important that this study was shaped within a Symbolic Interactionist framework (Blumer, 1969) to capture the unique participation of the participants as they made meaning of the research and authentically integrated ideas in their own context. Set in two early learning settings in Invercargill Aotearoa New Zealand, the research was designed to explore teachers' developing perspectives of what schema learning theory and socio-cultural theories of learning (particularly in children's 'thinking') offered them in terms of engaging with children's working theories. Furthermore, the study enabled the exploration of teachers' capacity to strengthen a relationship between research, theory and working theories to support the implementation of the Aotearoa New Zealand Early Childhood Curriculum, *Te Whāriki* (Ministry of Education, 2017).

In conceptualising this study, it was necessary to make explicit an overview of the historical culture of 'childhood' as it is portrayed in Aotearoa New Zealand, the influences of socio-cultural theories

on early childhood curriculum *Te Whāriki* (Ministry of Education, 2017) and the cultural shift towards the *thinking child.* While this research was not explicitly focused on *Te Whāriki,* the early childhood curriculum (Ministry of Education, 2017), as children's 'working theories' are mandated, it was important to critically analyse the potential for exploring children's thinking as it is explicitly included within the national curriculum framework. The setting of Aotearoa New Zealand and the historical development of education in this nation, created a unique context for this type of research.

The next section of this chapter analyses the values and priorities within the national curriculum and introduces schema as a rationale for the focus of the study. The final section of this chapter outlines further constructs of the thesis.

1.3 A historical image of childhood in Aotearoa New Zealand: 'As the thinking child?'

Internationally, Aotearoa New Zealand is recognised as a leading innovative and progressive context for early childhood education (May, 1997; 2019). Aotearoa New Zealand has a history of innovation in curriculum and pedagogical design and is well known within westernised countries for its bi-cultural focus (Mitchell, 2019). However, Aotearoa New Zealand's early childhood education has had a long political, cultural, and social history, weathering many storms due to changes in government and education policy. As a non-compulsory sector of the education system, over time early childhood education has relished in the success of politically savvy individuals advocating across diverse early years settings for equity and quality provision for teachers, children, whānau[3] and community. In her writing, Helen May (1997) (the author of *Te Whāriki* in 1993 and 1996) recognised the vast contribution of many individuals who fought for the rights of women and

[3] Māori word for family/extended family (see glossary of terms)

the rights of our youngest citizens to have equity and quality provision in early years environments. In another example, Anne Meade's recommendation to the government in *Education to be More* (1988) and David Lange's *Before 5* report (1988), who was the Prime Minister at the time, paved the way for insightful policy to ensure quality provision for young children and their educational needs in Aotearoa New Zealand (May, 1997). The growing need for childcare across this nation coincided with the women's feminist movement (May, 1997), creating a culture of advocacy and social justice in the early childhood sector through the 1980s and '90s which still drives the passion and commitment of many teachers today. Aotearoa New Zealand's early childhood provision is historically rich in a range of diverse provision, meeting the needs of working women and families and establishing a uniquely 'kiwi culture'[4] in early childhood contexts.

Aotearoa New Zealand's historical portrayal of the culture of 'childhood' has generally been one of modernity, enlightenment, play and a time for developing healthy attitudes to academic study and outdoor pursuits (May, 1997). Childhood has been valued as a time of innocence and fun, separated from the roles, decisions and 'woes' of adulthood. For some children, a childhood of innocence may have been their experience, however, this ideology has not been consistent for all children. Childhood for many children was something different, darker, reflected in a history of national statistics of children being bought up in domestic violence, abuse, bullying and suicide (Oranga Tamariki[5], 2018, 2023). For these children in New Zealand, the ideology and experiences of an ideal 'kiwi childhood' has been far removed from the reality of the lived experience. Congruent woeful statistics from *Oranga Tamariki* (2023) the data today provokes a view of childhood as an

[4]'Kiwi culture' refers to suggestions of what is unique to New Zealanders and how they grow up, ie.,valuing the outdoors

5 Oranga Tamariki – New Zealand's Social Welfare System

undercurrent of children with no voice, a discourse of childhood as a time of weakness, little to no autonomy and the property of parents. Children have experienced a history of traditional gender roles, the urbanisation and erosion of identity for indigenous Māori and the rise of violence and abuse in the home (*Oranga Tamariki,* 2023). Many children have been viewed as the property of others, as passive recipients without significant differentiation, autonomy, and needs (Mitchell, 2019).

Traditional and commonly accepted gender roles and perceptions of 'childhood' have heavily influenced families and their expectations of education. However, during the 20th century, Aotearoa New Zealand's educational policy and provision was influenced by international research and resulted in a significant change in law; a law commonly known as the 'anti-smacking legislation' intended to reduce the high statistics in child abuse (Oranga Tamariki, 2018; 2023). This significant policy **Crimes (Substituted Section 59) Amendment Act 2007** challenged a dominant discourse of parenting in childhood and promulgated the image of the child as 'having rights', as a citizen with a voice. The United Nations Convention on the Rights of the Child (UNCROC) (United Nations, 1990) has drawn attention to the agentic potential of childhood, supporting the uniqueness, diversity, and culturally constructed nature of children (Mitchell, 2019). Generally, it has become more acceptable in Aotearoa New Zealand to think that as a society, if we want a democratic, innovative, capable, and creative workforce in the future, we must raise our children differently. However, teaching children to think and act independently and critically through a lens of equity, diversity, and difference, is and will remain challenging for many New Zealanders due to issues remaining from inter-generational discourses. Aotearoa New Zealand's educational policy, for example the Education and Training Act (2020) has a commitment to the principles underlying

UNCROC as a basis for new policy and child advocacy. With this rise in postmodern thinking, the education sector has valued the independent *thinking child,* advocating that this image of childhood become more visible and in fact, necessary to enable opportunities to face the biggest challenges within society and humanity yet to come, such as poverty, sustainability, and disease.

1.4 Introduction to Schema

In the western world, research and theories informing education through the middle of the 20th century focused on the universality of human development (May, 1997). Referred broadly as a time of 'developmentalism,' this period is attributed to the westernised framework of 'stages of human development', considered instrumental in shaping normalised milestones in education for children across the western world, including Aotearoa New Zealand. A significant influence impacting on educational development of children around this time was constructivist Jean Piaget (1950) who proposed four stages of universal cognitive human development: sensory motor, preoperational, concrete operational, and formal operational. Piaget (1950) suggested these stages of cognitive development occurred within a broad age range, for example the pre-operation stage occurs from two to seven years. From his own research, Piaget suggested children would be able to demonstrate actions or behaviours to reflect changes in their cognitive thinking, then moving into a new stage. Said stages were deemed to be sequential and were necessary in terms of any cognitive progress. This dominant hegemonic model of developmental thinking strongly influenced curriculum development and educational policy at this time across the western world. However, it was other theorists such as Gesell (1952), Erickson (1959) Freud (1951, 2012), rather than Piaget (1950) directly, who contributed to a wider concept than cognition, rather of 'ages and stages'. In other words, Piagets (1950) cognitive stages were used by others in the development of their own theories

of ages and stages in motor/physical, social, intellectual and emotional development. One theorist in particular, Arnold Gesell (1952) researched and contributed to commonly used age related 'stages' aligning particular physical milestones within age groups. The 'ages and stages' phenomenon created a discourse of predictable universal outcomes and subsequent boundaries for intervention. For example, it would be considered predictable and normal that a four-year-old should be able to hop on one foot. Other stage-based theorists such as Freud (1951) and Erikson (1959) strengthened developmentalist thinking at the time, permeating priorities in social policy and normalised milestones of development (May, 1997). An example of how this discourse was adopted in Aotearoa New Zealand was through the Plunket Society (2024) (created in 1906 and now known as Plunkett Whānau Āwhina), established to support new babies and parents in their homes. During a large part of the 20th century Plunkett in Aotearoa New Zealand has held a critical role in visiting and supporting new parents, at the same time, promoting infant well-being through regularly checking developmental 'milestones'. Arguably a very worthy cause during a time of world wars and globalisation, however, Plunkett certainly had a role in contributing to a universal ideology of 'the normal child'.

Interestingly, Jean Piaget's (1950) cognitive stages of development theory was intended for the field of the psychology of human development and was never intended for educational settings (Marti & Rodriguez, 2015). The implications of this meant that the important constructivist nature of Piaget's (1950; 1953) work on cognitive development was minimalised due to thinking he was responsible for a universal framework for children's development spanning 40-50 years in many westernised societies. In other words, much of Piagets (1950; 1953) theory was lost in translation. Therefore, this thesis draws on Piaget's (1950; 1953; 1973) focus on how children cognitively process and

develop knowledge through their experiences rather than developmental ‘stages’ as such. This thesis argues that the cognitive constructivist theories of Jean Piaget (1950) are still relevant to teachers today to their understandings of how children learn; pivotal to understanding current socio-cultural theories of teaching and learning (van Wijk, 2008). Cognitive constructivist theories of children ‘coming to know’, and their development of ‘schema’ are pivotal to understanding children's thinking (Athey, 2007) and working theories of how the world works, and is most important to this study. Nikolien van Wijk (2008) further reinforces this when she states “Schemas are only one theory about learning. We need to know about them (schema) because they help us to understand the patterns we see in children’s play and why children are so driven to repeat them” (p. 2).

Drawing on schema learning theories is not a current approach that many Early Childhood teachers in Aotearoa New Zealand would be familiar with. This may be due to its historical and theoretical origins in developmentalism and or, aligning schema with Piaget (1950; 1953) and therefore developmental stages. Such ideas have been replaced by contemporary approaches of socio-culturalism. The cognitive constructivist theory of engaging with ‘schema’ (Piaget, 1950) suggests that as children engage and participate within their environment, they organise their experiences into thinking patterns or ‘schemes’. Schemes, as suggested by Piaget (1950), reflect the child’s ‘known’ knowledge. However, there are aspects of their thinking and learning which are not ‘known’, still coming together, and developing in their thinking. This developing knowledge is recognised as a ‘schema’ which is the area of interest for this study, specifically, how that ‘working knowledge’ is developed and explored by children, and ultimately, developed further through teacher practice within the framing of socio-cultural approaches to learning and knowledge

acquisition. Arguably, Piaget's (1950) theory of children developing understandings of their world within their environment is still very relevant to early childhood practice today. However, further exploration by neo-Piagetians continues to develop Piaget's (1950; 1953) dialectic analysis of human development into more contemporary theories of thinking and learning. Therefore, schema learning theory (Athey, 1990, 2007) could be considered a complementary theoretical approach to the sociocultural (Vygotsky, 1986), social-constructivist (Bruner, 1960) and dispositional approach (Carr, 2001) valued within New Zealand current theory and pedagogy.

1.5 *Te Whāriki:* Child's voice and agency enabling working theories

Historically, because of the presence of developmentalism, up until the early 1990s, the role of the teacher in early childhood education was to map and analyse 'developmental milestones' in accordance with stages of family and societal expectations of "normal development" as captured in the works of Piaget (1950) and others as outlined above. Primarily using the early childhood pedagogy of observation, teachers would make decisions about children's physical, social, emotional, and intellectual development using the developmental milestone lens. If a child was thought to be lacking in any area, a needs-based model of intervention-based planning was required to address what was lacking in development, with the aspiration of progressing towards the achievement of 'normal milestones'. However, when Aotearoa New Zealand's first early childhood curriculum *Te Whāriki* was drafted by 1993, introducing the rhetoric between developmentally appropriate practice and socio-cultural views of development, new expectations of learning were introduced to the early children teaching profession. Through increasing globalisation in international research and policy and engagement with indigenous concerns, alternative influences and theories enabled education to consider more socially and culturally diverse understandings of

human development and education (Rogoff, 2003), beyond that of normativity and universal developmental milestones.

Spanning almost 30 years in socio-culturalism and bi-culturalism (May, 1997), contemporary early years education in Aotearoa New Zealand has been transformed through curriculum growth and reform (Ministry of Education, 1993, 1996, 2017). Socio-culturalism drew the world of teaching and learning into the complex nature of the social and cultural ways children learn. On an international stage, *Te Whāriki* (Ministry of Education, 1996, 2017) also grew in its cultural understanding of the importance of empowering the rights and voice of all children, teachers, and families. *Te Whāriki* (Ministry of Education, 2017) is considered progressive and unique in terms of its non-prescriptive nature, its focus on learning capabilities and as a curriculum negotiated locally by the people, places, and things important to the people in it. *Te Whāriki* (Ministry of Education, 2017) is a bi-cultural curriculum, meaning the curriculum is bound by principles and strands of practice entrenched within the partnership implicit in the Tiriti o Waitangi (a partnership agreed to between iwi Māori, Indigenous people of New Zealand and the British Crown at the time of colonisation). *Te Whāriki* (Ministry of Education, 2017) advocates and integrates commitment to diversity and inclusive practice for all children 0-5 years. Unique to *Te Whāriki* (Ministry of Education, 2017), in comparison to alternative western curricula, is its focus on children engaging with strategies for learning deemed important for lifelong learning rather than a prescriptive, outcomes-based approach to curriculum. The pedagogy of *Te Whāriki* (Ministry of Education, 2017*)* mandates the socio-cultural ideology that children learn lifelong strategies, specifically learning dispositions and working theories through meaningful experiences and responsive relationships. Such thinking argues that the child is an active learner, a citizen with autonomy,

rights, and voice, who is visible at the centre of the curriculum's overarching philosophy, principles and strands. Through play-based experiences reflecting children's strengths, interests, and abilities, children learn knowledge, skills and attitudes relevant to their own and others' lives.

The socio-cultural framework of *Te Whāriki* values learning described as children developing working theories and learning dispositions.

> Working theories are the evolving ideas and understandings that children develop as they use their existing knowledge to try and make sense of new experiences. Children are most likely to generate and refine working theories in learning environments where uncertainty is valued, inquiry is modeled and making meaning is the goal (Ministry of Education, 2017, p. 23)

In other words, working theories reflect children's developing ideas, understandings or 'truths' about how they understand their own world. The 'developing or working' aspect suggests these are ideas that are in development, open to interpretation and influence from others. Piaget (1950) would suggest what is already known is an existing 'scheme', which acts as a reference point on which to base new understandings known as schema (Athey, 1990, 2007).

Te Whāriki (Ministry of Education, 2017) guides teachers to notice and bring value to both children's working theories (thinking) and learning dispositions within their socio-cultural pedagogical approaches of observing and working alongside children. However, in 2001 Margaret Carr published a socio-cultural narrative framework to capture and assess children's learning dispositions cognisant of the principles and strands of *Te Whāriki* (Ministry of Education, 1996, 2017) highlighting and bringing emphasis to learning dispositions. Learning stories (Carr, 2001) formats encouraged teachers to write their observations of children within the dispositional

framework created by Carr of taking an interest, being involved, developing curiosity and perseverance, taking responsibility and communicating with others (2001). As teachers engaged with this model of assessing children's learning dispositions, working theories became less of a focus for teachers (Hedges, 2012; Hargraves, 2013). From 2001, while a model for foregrounding the value of learning dispositions was introduced and implemented for teachers, there was no equivalent framework for noticing and responding to working theories. Policy documents created after 2001 such as *Kei tua o te pai*[6] have additionally focused the teacher lens on learning dispositions rather than working theories, drawing attention to a child's developing learning dispositions as the focus for understanding and planning for learning.

Due to the complex, historical practice in interpretation whereby teachers have traditionally prioritised learning dispositions to the detriment of working theories, it was my position as the researcher on entering this study, that in current practice, there is insufficient knowledge and frameworks available for teachers to enable them to identify children's working theories. The 'thinking' or working theories in current socio-cultural practice, is generally not recognised, responded to or valued as central to valid learning (Hedges, 2012, 2014; Hargraves, 2013) in the context of early learning in Aotearoa New Zealand.

There is a clear reason for such a situation. Historically there has been insufficient professional development and opportunities for teachers to become experts in identifying how working theories and thinking can be noticed, recognised, extended, and enacted. Researchers such as Hedges and Jones (2012), Lovatt and Hedges, (2015) Hargraves (2013) and Lovett (2014) suggest that many early childhood teachers in Aotearoa New Zealand struggle to identify and respond to children's

[6] Exemplars of learning stories/assessments on children's learning (2004-2009)

working theories within existing practices. Hedges (2012) referred to ‘working theories’ as the poor cousin of learning dispositions, suggesting that teachers are more aware of, confident and equipped to identify and work with learning dispositions as opposed to working theories. Hedges and Jones (2012) and Lovatt (2014) suggest a further reason for this is that there has been limited research and opportunities to support teacher practice in identifying and fostering children’s thinking as working theories, and that making such a shift in pedagogical thinking and professional practice takes deep involvement with the theory itself. Cullen (1999) suggests this struggle is still visible due to sustained, developmentalist ways of thinking, limiting teachers' ability to grapple with the theory and ideology behind the importance of learning dispositions and working theories. In other words, there is still a mismatch of underpinning theories present within curriculum expectations and implementation. Therefore, creating an opportunity through this research for teachers to examine and explore their perspectives on working theories as essential to their current practice.

1.6 A personal and professional narrative

As a kindergarten teacher in the mid to late 1990s, I was always fascinated by theories of teaching and learning, particularly in what motivates and drives children to say and do what they do within a free play structured environment. Within my first few years of teaching, I held and utilised a range of behaviourist (Skinner, 1963) and constructivist (Piaget, 1950; Erickson, 1959) approaches in my professional pedagogical repertoire. We were taught to observe children’s behaviours for antecedents and consider appropriate consequences; teachers at the time knew about intrinsic and extrinsic motivation and relished in the glow of children’s compliance and obedience in response to teacher planning and decision making! However, I experienced limited reward as a teacher when focusing on correcting behaviours in children's learning; in other words, it was a challenge to know if I was meeting my perceived expectations of being a successful teacher at that time or was there

something more that would open us up to the possibilities and aspirations of our children. Over time, it seemed I was open to alternative ways of thinking about children and became increasingly focused on the thinking processes and 'working theories' of the children with whom I was working. I felt drawn to the children who asked the biggest questions of the world around them, who pondered conversations and would return to similar ideas again and again, even after a series of hefty deliberations and views were researched and debated. Such interactions motivated and influenced my teaching as I actively encouraged more and more diversity and provocation into inquiries and discussions. I found this type of approach complicated at times as many topics of investigation or conversation would not always be conducive to the values of parents or my colleagues; however, my fascination with children's ability to analyse and synthesise, revisit and re-problematise was growing.

An opportunity to consider children's 'thinking' and how this transpired through children's explorations in terms of schema learning theory (Athey, 2007) arose through a colleague of mine doing postgraduate study at the time. My colleague had been living in the UK and did her Master's thesis through the Pen Green Centre (2024) in Corby, England where they had a very strong interest in working with parents and schema learning theory and the work of Chris Athey (1990, 2007). Prior to when I completed my teacher education training in the early 1990s, schema learning theory had been of interest in the early childhood community, however by then, it became lost within more contemporary social, cultural, and behavioural theories of teaching and learning. I held no prior knowledge of the theory as it had never been part of my initial teacher education. However, there has always been ongoing international and national interest from small groups of researchers such as Chris Athey and the Froebel Early Education project in the UK (2007), Margy Whalley and the

Pen Green Centre in the UK (2001), Anne Meade (2005, 2008), and Pam Cubey (2008) who have lead research projects in the Aotearoa New Zealand context. Other studies of interest reflecting a range of research findings in the possibilities of schema enhancing children's thinking that influenced my thinking included the works of Bruce (2005), Nutbrown (1999) Poplur (2004), and van Wijik (2008). In particular, I found the work of Anne Meade and Pam Cubey (2008) in their book, *Thinking Children* fascinating. Their work made sense within the more social, dispositional focus our kindergarten teaching team had at the time. Mitchell and Cubey (2004) and later Cubey (2008) researched the ways in which schema had an impact on children and parents at Wilton Playcentre, a New Zealand centre of innovation recognised for its professional expertise and leading the way in the discourse of working with parents and schema theory.

My interest in trying to recognise children's thinking as the core essence of learning developed through many discussions and observations of children in their play through the lens of schema (Athey, 2007). For example, I began to recognise the unique ways in which young children collected and sorted resources and generally spent time and effort considering the placement and organisation of their environment around them. It occurred to me that this 'organising' was a deliberate and strategic engagement within their context and, at a particularly insightful moment of my career, I realised I had not paid a lot of attention to this before. For example, in my kindergarten, particular children could often be found sorting items behind a piece of furniture, or physically folded up inside the furniture of the family corner, behaviours I might have previously not noticed, or thought were inappropriate. We had one child who would organise the desks in the collage/art area around herself in a circle, so that she was always enclosed inside a space as she worked. Then she would arrange dozens of empty yogurt containers around her circle of desks and

spend hours cutting small pieces of coloured paper and sorting them into the containers according to their colour. She would become irate if any other children were to come too close or endeavour to participate with or alongside her. Upon realising that this repetitive behaviour might be significant in the way this child processed her world, we responded by creating another space for children so that she could be left to her methods of investigation. However, we were not sure *why* she was doing it or what we were meant to do! As teachers we investigated and thought that this child might have had a dominant schema in *enclosure, collecting and sorting* (schemas identified by Athey, 1990, 2007) which could be observed through several aspects of her play and possibly therefore, her thinking. For example, her ongoing engagement in learning included organising and sorting of children, equipment and within games. Her mother also became interested in her repetitive behaviours and began documenting any behaviours that she noticed at home which reflected her thinking around such schema. Athey (2007) suggested parents could equally be extremely knowledgeable about their children's schemas and were in a critical position to observe and monitor these behaviours as some had been established since birth. At the time, while I never quite understood the teacher's role within schema theory, I did know enough that it was considered effective practice to create further opportunities for the type of exploration and thinking the child was demonstrating. Schema learning theory (Athey, 1990, 2007) suggests that when children repetitively engage in similar types of behaviours, this can indicate that they are trying to cognitively 'figure something out' to understand a particular relationship, explore cause and effect or problem solving and so they revisit the activity to consolidate, trial, and test their understanding (Athey, 2007). As a team we tried to create further opportunities for this child to be involved in sorting and collecting within enclosed spaces, that is, sorting groups of items and collecting groups of children in games with blankets or boxes. It was obvious through this time that the child enjoyed

such experiences and would often come up with new ideas to increase her own role in sorting and collecting, perhaps testing her schema and coming up with new ways of using it. What really consolidated this theory for me, was at a time after this child left the kindergarten and went to school. Having been at school only a short amount of time, her mother returned to the kindergarten and told us that her daughter was really struggling with particular practices in the classroom related to learning numbers and letters of the alphabet. After much discussion, we suggested that a meeting with her teacher might be a good idea, to share what we knew about this child and her schematic methods of making sense of her world, mainly collecting, sorting, and feeling enclosed. Again, this level of interaction with the theory pushed us further than ever before as we found ourselves trying to articulate a theory of learning that we were only just beginning to consider ourselves; but it made such good sense to us! We met with her teacher and discussed what we had learned, however, this was not particularly well received by the school. However, her mum embraced her daughter's preferences at home where she would create activities at home for her to collect and sort numbers and letters through games involving sorting and enclosing and was very excited at how quickly her daughter responded.

Never throughout my career, had I asked myself why children might engage in such specific behaviours that I had often thought were annoying, fruitless or lacking meaning. Before being exposed to schema, I might have insisted that children should clean up their mess, or physically get out of the furniture as it wasn't considered ‘normal nor appropriate behaviour’ to be sitting inside pieces of furniture for substantial amounts of time. However, once thinking about why a child might be behaving in such a way, it made me stop and consider what was motivating the child to do so. From then on, this discovery transformed my view of children's learning and *children’s thinking.*

Even now, I find myself asking why a child might be doing what they are doing? What is motivating the child and what are they thinking about? Have they done this before? What other behaviours might connect with this one to give me an indication of their thinking patterns?

1.7 Overview of the thesis questions

Based on the aforementioned context and theoretical developments particularly relevant to early childhood learning and curriculum in Aotearoa New Zealand, the purpose of this research was to explore the central research question:

> "What are teacher's perspectives when exploring schema learning theory to understand children's working theories within their current socio-cultural practices?"

Further threads of interest in the research related to the central research question were to the following sub-questions:

1. Investigate early childhood teachers' perspectives on how they identify children's thinking (as working theories) with the addition of 'schema learning theory' (Athey, 1990, 2007) alongside their current approach.
2. Explore any possibilities teachers can undertake to strengthen their understanding of children's thinking, using schema learning theory to identify children's working theories within their current socio-cultural context.
3. Explore the 'thinking child' in everyday practice with teachers, to better understand what might build their confidence to explore children's cognitive and intellectual learning within their existing practices.

4. Engage with neo-Piagetian theories of cognitive constructivism, in particular Anne Mead and Pam Cubeys (2008) work in *Thinking Children* and Chris Athey's (1990, 2007) analysis of schema learning theory in *Extending Thought in Young Children*

This was a qualitative interpretive study underpinned by the principles of Symbolic Interactionism (Blumer, 1969) as the theoretical foundation for the research design. The research methods therefore were shaped by, or drew on, tools that allow for qualitative interpretation. A Symbolic Interactionist approach (Blumer, 1969) captured the meaning constructed through social interaction within the teaching teams, recognising that each teacher bought their own experiences, understandings, and realities (Nuttall, 2004) to each context. Meaning was created through shared and individual symbolic internalisation of language making new meanings and understandings (Mead, 1934). In this study, teachers had the opportunity to construct changes in their thinking and practice, a process of central interest to Symbolic Interactionism (Blumer, 1969). The narratives that took place with each teacher and across the research communities as teachers engaged in the reconstruction of their thinking, formulated the core data on which this dissertation is based.

1.8 Conclusion and overview of following chapters

Chapter One provided an overview of the aims for the study, including a background to the theoretical constructs that underpin the contemporary Aotearoa New Zealand conceptualisation of the ‘thinking child’, a brief overview of the early childhood context in Aotearoa New Zealand, and my experience with schema and socio-cultural approaches that have motivated this study on children's thinking and learning.

Chapter Two explores a diverse range of literature relevant to the focus of the study. In addition, there is an exploration and analysis of the historical origins of Jean Piaget's (1950, 1953, 1973) theories of cognitive constructivism. The literature review then begins to make headway into more current approaches and thinking about cognitive learning within the context of Vygotskian and Neo Vygotskian theorists such as Margaret Carr (2001) and Helen Hedges (2012, 2014), explored within national and international projects. The chapter then positions cognitive constructivist approaches, including schema learning theory, alongside and within a socio-cultural epistemology of education, forming the theoretical conceptualisation underpinning the study. Research examples conducted in Aotearoa New Zealand, highlight the integration of both theories of learning specific to connecting to children's thinking are explored in the literature review.

Chapter Three articulates the methodological framing of the study. This research is shaped by a qualitative symbolic interactionist approach to research and uses narrative and interpretive methods of data collection and analysis. Chapter Four gives a detailed analysis of Symbolic Interactionism as the chosen methodology that best aligns with the proposed aims of the research. The chapter also outlines the methods adopted for the study, the process of recruitment of participants, the role of participants in the study, and my role as the researcher. Chapters Five and Six investigate the three full phases of the research data, collection and analysis. Phase one of the study was designed to investigate and explore the teachers' frameworks for identifying and exploring children's learning in their current practice. In Phase two the purpose was primarily to introduce the teachers to opportunities in professional development: to explore socio-cultural and schematic learning theory and what this meant for their practice. Phase three reflected the data gathered by teachers after working with children they had identified as demonstrating dominant schematic learning in their

exploration and includes some brief analysis. Chapters Seven and Eight discuss and analyse the full findings of the research and position these findings in the context of the contextual and empirical literature in this field. At this point, the significance of the research and the research findings are articulated and the significant contribution to new knowledge in the field is celebrated and makes recommendations for further research. Limitations of the research are also considered.

Chapter Two: Framing the Study - The Literature Review

2.1 Introduction

Chapter Two explores the conceptual framing for the study, considering the historic and contemporary literature and theories of learning that have underpinned early childhood education in Aotearoa New Zealand. Historically, developmental theories have shaped early childhood education which has privileged a theoretical lens of children's development over learning; in other words, as children mature and get older, this drives their development. However, over the last 30 years more contemporary socio-cultural and social-constructivist theories have gained momentum giving weight to the social and cultural nature of learning (Vygotsky, 1986).

The chapter is presented in three sections. The first section begins with the exploration of Jean Piaget's (1950, 1952, 1953, 1973) theories of cognitive constructivism and schema as a beginning rationale for this research. Piaget's theory of cognitive constructivism provided a psychological foundation, informing educational discourse in Aotearoa New Zealand education for over 50 years and therefore, arguably, is still visible and present within current contexts of socio-cultural learning today. Further exploration into neo-Piagetians perspectives such as Chris Athey, (1990, 2007), Anne Meade and Pam Cubey (2008) and others, continues to highlight Piaget's dialectic analysis of cognition as influential in shaping contemporary theories of thinking and learning in education. Through this exploration and review of contemporary learning, a diverse range of relevant literature is critiqued, contributing to building a platform on which this study is conceptualised.

In section two, the literature explores the contribution of socio-cultural theories of Vygotskian and neo-Vygotskian theorists such as Margaret Carr (2001) and Helen Hedges (2014) and others, in

shaping education. The literature review explores research relevant to early childhood learning and curriculum in Aotearoa New Zealand, from national and international origins. This section of the literature review critiques research relevant to schema learning theory working alongside and within a socio-cultural epistemology of education. Both schema learning theory and socio-cultural learning theories stem from opposing epistemological beliefs, and therefore each needs to be critically analysed and considered as important in conceptualising this research.

In section three, the literature review situates this thesis within the interplay of both theories; ultimately, the context of influential contemporary theorisations of cognitive constructivism (schema) and the potential this offers for future teacher practice in noticing, understanding and responding to children's working theories. The review extends to an examination of the way that both theories of cognitive constructivism (schema) and socio-cultural theories might influence teachers' perspectives when noticing and responding to children's working theories.

In conclusion, the chapter reviews research which highlighted the way in which both theories of learning have been used in studies that have offered relevant insights for conceptualising this research (Cubey, 2007; Lovatt & Hedges, 2014; Meade & Cubey, 2008; Poplur, 2004, and van Wijik, 2008).

2.2 Section 1 – Piaget and cognitive constructivism - Schema

This section provides an analysis of the literature in cognitive constructivism from Jean Piaget's (1950, 1952, 1953, 1973) early explorations of epistemology and then considers more recent studies in schema learning theory developed from his original ideas. While a study of Jean Piaget and his theory is not the focus of this research, it is still of critical importance in terms of the development

of schema learning theory. The literature focuses on Piaget's theories of the 'construction of knowledge' rather than any notions of 'ages and stages' theory which he is often associated with. The focus for this research is on Piaget's (1950) theorising of how children 'cognitively come to know' through their explorations within their environment; knowledge that many neo-Piagetians have since reiterated as still being very relevant to more contemporary theories of thinking and learning (Marrti & Rodriguez, 2015). Many researchers' analysis of Piaget's work draws attention to his overall lack of interest in the social and cultural influences on children's learning, favouring the process of learning as more of an individual, developmental pursuit. This literature review (Athey, 2007; Meade & Cubey, 2008) highlights that while notions of Piaget's 'ages and stages' framework theory has been backgrounded within early childhood discourses in favour of more contemporary thinking, many would argue his work on cognitive constructivist theory is still historically and theoretically significant and clearly embedded within current socio-cultural and social-constructivist conceptualisations of early learning (Athey, 2007; Meade & Cubey, 2008). There is substantial literature written about Jean Piaget (1950), both on the merits and limitations of his theories. For example, Eduardo Marti and Cintia Rodriguez (2015) in their book *After Piaget* have extensively reviewed and created a dialectic analysis of contemporary research to critically re-consider Piaget's conceptualisations in more modern contexts. Clearly obvious in this work is the discourse that Piaget's theories of cognitive construction need to continue to be relevant for those thinking about human development, now and in the future (Marti & Rodriguez, 2015). For this project, literature describing his theory of how humans cognitively 'come to know' is the focus rather than his work on cognitive stages. Thus, it is necessary to begin with a critical analysis of Piaget's (1950, 1952, 1953) theories from a broad array of historical literature sources as this represents a major contribution to the motivation for this research, and the origin of schema learning theory.

Piaget's theories of cognitive constructivism (1950) and 'genetic epistemology'(1969), significantly contributed to human psychology and education throughout the western world from around the 1960s (Ginsburg & Opper, 1969; Marti & Rodriguez, 2015). "Piaget himself used a more complex term 'genetic epistemology', to label his approach but this daunting term really just means 'the growth of knowledge' which is also what cognitive development means" (Morss, in Morss & Linzey, 1991, p. 10). While Piaget (1952) referred to himself as a 'constructivist,' he argued in his writings that an individual's intelligence is genetically inherited and then exposed within the external world. In other words, he suggested individuals are born with internal data and that is transcended through exposure to experience and activity. Piaget's theories (1953, 1973) lay in his fascination with biological influences and within the epistemology of children's development and learning, believing all humans were born with innate abilities they were not required to learn. For example, he highlighted the significance of how a maturing infant can quickly adapt to their surroundings without guidance from others (1953). His epistemological interest was in the adaptation of content, structure, and the functions of the environment, contributing to the ongoing development of intelligence. Piaget suggested it was the relationships between genetics and the engagement with the environment, creating the 'content' of a child's thinking (Piaget, 1952; Ginsburg & Opper, 1969). Piaget (1952) suggested early cognitive structures are influenced by environmental influences that create the beginning of intellectual activity. He proposed two biological functions within the development of intelligence: organisation and adaptation. Adaptation being the equilibrium between the individual and their environment, a process of modification between his concepts of assimilation and accommodation.

> "Intelligence is assimilation to the extent that it incorporates all the given data of experience within its framework" (Piaget, 1952, p.6).

Therefore, a summary of Piaget's (1952) initial research conceptualises intellectual development as a process of adapting, modifying, and assimilating new experiences, discovering knowledge, accommodating and creating cognitive equilibrium. He argued further that the success of the process would be dependent on the stability of the process of assimilation and accommodation and only when equilibrium is reached.

Piaget's (1950, 1952) original theory suggested there was a universal framework for cognitive human development, implying that all children developed through sequential stages of thinking. The critique of this idea has been that such stages were found to reflect a very small proportion of developing children and was not, in fact, the universal experience originally thought (Morss, 1992). It was Piaget's concept that as children engage and explore things of interest to them in their environment, they construct deeper understandings particular to problem solving and science, and how things work (DeVries, et al., 2002). Piaget (1952) felt interaction with other children was less significant than what came about as a result of 'action'. For an infant, Piaget (1952) argued their thinking was motivated through their individual exploration and not by other children or adults around them. Consequently, Piaget advocated that children's interactions and actions with their environment were to be encouraged through using concrete materials focused on developing particular areas of manipulation (Piaget, 1952). This theory rationalised that knowledge was discovered through the child's own interaction within their world, in other words, existing knowledge of the world around them is revealed through activity within their environment. Piaget (1952) suggested that when children are engaged in the process of cognitively discovering new ideas, they should be given uninterrupted time and opportunity to investigate materials of their own interest. While it is generally accepted that Piaget did not value social engagement for learning, he

did see value in the adult or teacher to create disequilibrium within cognitive development, to challenge new thinking. He argued:

> "(The teacher) is needed to provide counter examples that compel reflection and reconsideration of overhasty solutions. What is desired is that the teacher ceases being a lecturer, satisfied with transmitting ready-made solutions; his (sic) role should rather be that of a mentor stimulating initiative and research" (Piaget, 1973, p. 16).

Piaget (1952) theorised that through sensorimotor activity, children develop significant schemata (schema) which leads to perceptual understandings of the world around them. Piaget (1952) clearly articulated that sensorimotor development or what is more recently recognised as the construction of thinking schemata, preceded and was necessary for later development and assimilation of language and thought or pre-verbal intelligence. In conceptualising this study, this particular line of Piaget's rationale (1952, 1953) is deemed significant as will be illustrated later in this chapter.

2.3 Cognitive constructivism into the development of schema

At the heart of Piaget's 40 years of research of the psychology of childhood and human development, lay his interest in the study of epistemology as well as the science of genetics. While he acknowledged throughout his work that knowledge is discovered through interaction within the environment, he reiterates that genetics (or biology) have an equal influence on the development of the person (Piaget, 1952). Piaget suggested that through engaging within an environment, an infant for example, is required to make sense of what is already known and make sense of new information, and to develop new understandings to accommodate and adapt to the unknown (Piaget, 1950; Ginsburg & Opper, 1969). The child therefore develops, what Piaget named, mental structures or schemas (Athey, 2007).

Piaget (1950) argued that when children went through the process of ‘thinking’, they were able to build internal structures and link cognitive connections, building their capacity for more advanced thinking. Intelligence for Piaget was about exploring the range and methods in which children think, the ways in which children might respond and adapt to their own environment. He believed intelligence was a biological process influenced by an individual's environment and suggested that intelligence was a gradual process which occurred through development and connection of cognitive structures, known as a scheme or schema (Ginsburg & Opper, 1969). With this thinking, his research moved into developing testing methods to explore a child’s particular ‘lines’ or ‘threads’ of connected thinking. Establishing this idea of particular ‘lines or threads’ of thinking in children's explorations of schema later became the focus for other researchers whose findings are analysed further in this chapter (Athey, 2007; Meade & Cubey, 2008).

A significant thread of Piaget’s theory resonates with the broader discourse of human development; in other words, development precedes cognitive learning (Piaget, 1950). There remains a constant tension within Piagetian theory between the biological and environmental influences on development, which ultimately and arguably, both have a role with the child’s developing intelligence. This tension is constant within all of Piaget’s cognitive stages; as outlined in the following example. Within the sensorimotor stage (0-2years) Piaget suggested that initially biology dominates the infants actions, of which they are only capable of organising. Contentiously for more contemporary theories of learning, he argued that a newborn is not capable of ‘thinking’ as such and totally relies on learning through repetitive actions and reactions from their environment. He argued that the infant is not able to rely on existing structures as they have not had the experience necessary from the environment (Piaget, 1950). However, socio-cultural advocates (Vygotsky, 1986) would

argue that the newborn is active and is able to distinguish features of their environment and modify their own actions as they learn from recurring activity around them. Piaget determined that this is an extremely important stage as these early interactions between an infant, their biology and the environment, is the beginning of their developing intelligence. As they begin to organise structures from their environment, these can be shaped into repetitive behaviours, which Piaget termed 'schema' (Ginsburg & Opper, 1969). "Schemas become coordinated with each other and develop into systems of thought" (Athey, 1990, p. 160) as the individual interacts with the environment. Again, this key proposition is influential in conceptualising the theoretical framing of the study that unfolds in this dissertation.

2.4 Critiques of cognitive constructivism and schema learning theory

Sugarman (1987) argued that Piaget's unique contribution to the ways in which we might think about intellectual development provided a framework and direction for thinking about cognitive development in western education. However, further critique of Piaget such as that outlined above, is centered on the idea that he held little regard for possible variations from his 'stages' of thinking and never really engaged with influences of emotions, culture or diversity that might have had an impact on children's engagement. Over time this has been deemed a major weakness of his work. Piaget's work has been highly critiqued in terms of only being interested in the attainment of higher levels of children's capability and intelligence (Ginsburg & Opper, 1969). However, Bronckart (2015) has also identified the usefulness of Piaget's theory in constructivism and, within contemporary learning theories. Bronckart (2015) suggests Piaget's stages of development were no longer relevant to social constructivist/socio-cultural theories of learning because Piagetian theory was no longer aligned to contemporary recognition of diversity across the ways in which young children learned. Arguably this is significant as Piaget never highly valued the influences of

language, culture and social interaction in his work, in other words, the child was conceptualised as an ‘individual’, independent of social context. Bronckart (2015) further argued that Piaget’s early theories based on observations of children were not only limited because they were of his own children, but because they were limited to adult to child observations only, suggesting a lack of examples of data to substantiate his theories. Bronckart’s (2015) analysis of Piaget's observations highlighted the ways in which Piaget himself spoke to, or provoked, verbally or nonverbally, the children he was observing, challenging his idea that others did not have a role in the learning process. Piaget was found to have ‘guided’ children in the observations in particular ways, therefore socially interacting with them. Therefore Bronckart (2015) argues that Piaget’s findings, were in fact, influenced by social and symbolic factors, an influence Piaget would have never directly acknowledged himself.

An important critique of Piaget’s (1953) theory focused on his positioning of the role of biology in human development. He suggested that development only occurred through phases of maturation. In other words, if the child was not biologically developed sufficiently, they would not be expected to be ‘ready’ for particular thinking levels or functions (Ginsburg & Opper, 1969). For example, Piaget suggested that a very young child is always egocentric in their perspective; their view is upheld by the individual as the absolute truth and that the child is not particularly interested in the opinions of others. Sugarman (1987) however challenged the veracity of Piaget’s theories and argued that one cannot assume all children are being egocentric but for a range of reasons, may not be able to consider the ideas of others. Further he questioned Piaget’s concept of the ‘egocentric child’, a concept that instilled the practice of encouraging children’s solitary exploration in education, based on the view that young children are too immature to be able to relate to others.

Sugarman (1987) suggests that being egocentric can only be identified when an individual 'is able' to take the perspective of another, however, chooses not to. Sugarman (1987) draws caution to the idea that all children are egocentric as socio-cultural and familial diversities within children's lives and experiences cause some children to be more open to the ideas of others or not.

Piaget (1969) faced challenges in his theory of universal human development due to differences in children's biological and environmental schemas, making each child unique; a reality that he could not philosophically deny. Increasing awareness, research and literature from socio-cultural theories have challenged Piaget's (1950, 1953) earlier claims that cognitive thinking only occurs through engagement with the environment. Socio-culturalists argue that children's cognitive learning is constructed and not discovered, as knowledge is influenced by history, culture, family and the environments in which the child is situated (Rogoff, 2003). This literature challenges the historical dominance of Piagetian theory and introduces variables and constructs into the conceptualisation of children's thinking that is embraced by socio-cultural thinkers, who, on the one hand, value the place of constructivism in childhood thinking and development, and at the same time, recognise the influence of a variety of constructs that Piaget failed to recognise.

2.5 Section two: Socio-culturalism and the development of working theories

Socio-cultural theories in learning are essential to conceptualising this research because they underpin contemporary thinking and practices in early childhood education teacher education and practice. This body of literature focuses on theories of the social and cultural nature of constructing knowledge (Vygotsky, 1986, Rogoff, 2003); that is, the significance of the collaborative nature of learning rather than the individual discovering knowledge within an environment, as suggested earlier by Piaget (1952). Examples of socio-cultural research and literature are highlighted and

analysed with regard to investigating the development of children's working theories within contemporary research and practice (Hedges, 2012, 2014).

A post developmentalist theory of socio-culturalism (Vygotsky, 1986, Rogoff, 2003) focuses on children's rights, social justice and diversity within models of human development, cognisant that 'normative development' was not universal but a culturally and socially constructed process where learning, not development was the focus of the theory (Vygotsky, 1986, Rogoff, 2003). Socio-cultural discourse in education has challenged historical images of 'the universal child' in favour of childhood that acknowledges and respects the 'diverse child', normalising difference as a significant aspect of the human condition and experience. In other words, cultures, and societies of diverse peoples all value and construct their truths about the world in a range of ways, with the knowledge that it is through the exploration and examination of such difference, that enables us all to grow and learn (Rogoff, 2003). Contemporary academic theories and research such as those within a socio-cultural paradigm (for example, Vygotsky, 1986, Rogoff, 2003) have provided ways of thinking about children's learning particularly when trying to understand the complex and diverse influences on children's behaviours, attitudes, curiosities, and interests. Socio-cultural theories draw an emphasis on the social and cultural nature of children's interactions, relationships, socialisation and engagement (Vygotsky, 1986). In socio-culturalism, learning drives development (Vygotsky, 1986; Rogoff, 2003, Hedges, 2022), in contrast to Piaget's cognitive constructivist and individualistic theories of learning. Such theories (Vygotsky 1986; Rogoff, 2003) encouraged teachers to think about children more holistically rather than conceptualising their learning in universal cognitive stages. As Piaget's theories have generally been critiqued and increasingly disregarded in many ways, socio-cultural theories have come to dominate early childhood teaching

and learning in Aotearoa New Zealand (Hedges & Jones, 2012). Lev Vygotsky has been a significant historical voice in the theories of socio-culturalism (1930-1935, 1978). Vygotsky argued that human development and cognitive functioning and construction was a result of the social and cultural nature of the child's life. In other words, as young children participate within their own cultural context with others, they learn to construct understandings of their world and how they can function or become positioned within it. Vygotsky (1930-1935) emphasised the importance of shared interaction and language between children and with adults, as a critical process in cognitive development. Laura Berk and Adam Winsler (2002) captured the essence of Vygotsky's socio-cutural theory:

> "One of the main tenets of Vygotsky's theory is that people are products of their social and cultural worlds and that to understand children, we must understand the social, cultural and societal contexts in which they develop" (p. 1).

Vygotsky's contribution to the collaborative way children cognitively construct understandings of their world, included his theory of the importance of adults engaging within a child's zone of proximal development, or ZPD and scaffolding (Berk & Winsler, 2002, Hedges, 2022).

> "The ZPD is the dynamic zone of sensitivity in which learning and cognitive development occur. Tasks that children cannot do individually but that they can do with the help from others invoke mental functions that are currently in the process of developing, rather than those that have already matured" (Berk & Winsler, 2002, p. 26).

From a socio-cultural perspective, when adults (or more knowledgeable others) engage with what a child can do or already know by themselves, but could learn with the help of another person, is able to draw the child into a zone of possibilities that are relevant and engaging through scaffolding.

> "The social environment is the necessary scaffold, or support system, that allows the child to move forward and continue to build new competencies….this interaction style has repeatedly been shown to foster general cognitive growth and to increase children's performance on a wide variety of tasks" (Berk & Winsler, 2002, p. 26-27).

When adults engage within a child's zone of proximal development, the adult has the capacity to scaffold, explore and construct new understandings with the child. Therefore, from a socio-cultural perspective, the adult or more knowledgeable other is considered significant in the child's ability to construct and make sense of their cultural world around them (Hedges, 2022).

Over the last 30 years the Aotearoa New Zealand Early Childhood Curriculum *Te Whāriki* (Ministry of Education, 1993, 1996, 2017) has reflected a post-developmentalist shift in theory and pedagogy, with the latter version reflecting the most current ideological, socio-cultural and theoretical framework of pedagogy, teaching, learning and assessment. *Te Whāriki* (Ministry of Education, 2017) has four principles at the heart of teacher practice and participation for children. The curriculum is underpinned by socio-cultural values in empowerment, relationships, family and community and holistic development, all woven together with learning concepts from te ao Māori[7] (Ministry of Education, 1993, 1996, 2017) ensuring children are immersed in cultural contexts unique to Aotearoa New Zealand. *Te Whāriki* (Ministry of Education, 2017) encompasses the complexities of socio-cultural learning and diversity, focusing on the importance of children developing robust learning dispositions and working theories as valued outcomes of early childhood learning. Working theories are described as:

> "Working theories are the evolving ideas and understandings that children develop as they use their existing knowledge to try to make sense of new experiences. Children are most likely to generate and refine working theories in learning environments

[7] The Māori world

> where uncertainty is valued, inquiry is modeled and making meaning in the goal" (Ministry of Education, 2017, p.23).

However, it has been learning dispositions that have dominated the lens for valued learning. Since the development of *Te Whāriki* in 1996, teachers have been provided guidelines, frameworks, professional learning and guidance in assessment policy, valuing the importance of noticing, recognising and responding to children's learning dispositions. However, according to Lovatt and Hedges (2014) and Hargraves (2013) there has been limited opportunity for teachers to develop their understanding of children's working theories. Lovatt and Hedges suggest why:

> "Research thus far on working theories has largely utilized the socio-cultural theoretical underpinnings. Thus, the potential contribution of Piagetian notions to the development of working theories has not been well investigated….and largely bypassed by subsequent post-developmental theories" (2014, p. 909).

However, *Te Whāriki* (2017) equally values learning dispositions and working theories as valued learning. Focusing on working theories values the capacity for young children to cognitively engage with and understand how their world works. Children are learning new ways to think, theorise, make sense of and explore new knowledge and understandings that might link to ideas around their identity as well as science, math and literacy. Working theories 'theory' would suggest children hold many existing understandings about their world in which they can draw on when involved in new learning (Lovatt, 2014).

> "Prior research on this concept (working theories an outcome of *Te Whāriki*) has primarily utilised socio-cultural theoretical underpinnings and neglected Piagetian constructivist theories" (Lovatt & Hedges, 2014, p.9)

According to Smith (2016) key socio-cultural approaches to developing working theories include teachers and children involved in co-construction and scaffolding, in open-ended questioning and discussions with peers. Lovatt (2014) suggests that developing shared understandings between children was critical. Together they can repeat and summarize ideas, exploring words and helping others to understand using an 'interest' to add to the conversation. Simmons and colleagues (2005) and Hargraves (2013) suggest teachers need to work "intentionally" creating opportunities to express, share and refine understanding and thinking with children. Lovatt (2014) further argues that working theories lead to complex thinking, making connections, developing interests, and sustained shared thinking as integral components of early learning.

Working theories therefore are contextual to the child and their experience and change in relation to ongoing participation and engagement, where children's understandings are constantly evolving and transforming, hence the 'working it out' aspect of the theory. Lovatt (2014) suggests children's learning and thinking is always 'in progress' and is reflective of Piaget's ideas of disequilibrium and equilibrium (Piaget, 1952). Working theories can be demonstrated and identified through children's behaviours and attitudes to self and others and the learning environment. With the focus on working theories, opportunities for children's learning arise valuing real conversations around diversity, social justice, conflict, and the capacity to consider a range of perspectives in contrast to one's own. Children's working theories are reflected through their interests, investigations and play and should enable teachers to engage with children in complex, meaningful, real conversations. However, according to Lovatt and Hedges (2014) with a limited gaze on children's working theories from research, government, and providers of professional development for teachers, many early years teachers struggle to identify and respond to children's working theories.

Daniel Lovatt's (2014) thesis recommendations were for teachers to develop "[a] deeper understanding of the context of working theories that support teachers to foreground the learning outcome that is the 'neglected sibling'' (Hedges & Jones, 2012, Lovett, 2014, p.28). Lovatt (2014) calls for the necessity to continue his research in order is to stretch children's thinking as there is inconsistency in the field about 'how' teachers can do this. Lovett's (2014) study focused on teachers' strategies and approaches to support and challenge children's working theories. In particular, he focused on analysing the role of the teacher in developing complexity into verbal interactions with children. Lovatt (2014) suggests children engage in the world as they think. This means if they have working theories of themselves, their value and worth, this can be measured through their types of behaviours. Lovatt (2014) along with Guy Claxton (1990) suggests the process of developing working theories should be a dynamic one with teachers who are able to recognise and to respond with relevance to a child's working theory.

2.6 Teacher responses to sociocultural curriculum

There have been several studies that focused on teachers struggling within the socio-cultural framework in their attempts to identify and respond to children's working theories. One example is Areljung and Kelly-Ware's (2017) significant study which focused on the role of the teacher in the development of children's working theories in Aotearoa New Zealand. In order to establish working theories, the authors suggest that teachers are responsible for engaging with children's interests through either responding to or provoking to extend their thinking. The Areljung and Kelly-Ware's (2017) study considered the role that teachers had in either assisting with, reconstructing or silencing children's developing working theories. They found that teachers can assume what the child is thinking too quickly and offer solutions to their investigations without providing

opportunities to ponder or to explore new questions or possibilities. Areljung and Kelly-Ware's (2017) research also highlighted the significant power teachers were able to employ in deciding which working theories were being addressed over others. Some 'working theories' were considered more of a risk for teachers than others, causing them to avoid developing ideas. Teachers were found to quickly dismiss or silence working theories considered 'risky', often to calm extreme reactions or emotional outburst from children. 'Risky' working theories involved discussions with children around issues of social justice and conflict, or topics considered more suitable for children to have with parents. Therefore, such topics were more likely to be explored within a shorter timeframe and not revisited to develop any depth in understanding. Areljung and Kelly-Ware (2017) suggested that if teachers do not take opportunities to engage with children in 'risky' working theories, this may make it difficult for some children to make sense of important events or ideas relevant to their lives. They suggested in their research that at times, teachers dominated the child's direction of thinking, silencing children's voices at opportune moments. In their study, they found teachers control where and how working theories are explored, and this was variable due to the teacher's individual values, characters, and expectations of the early childhood setting. In other words, if children's working theories fit with the expectations and values of the teacher, their ideas were more likely to be actively explored by the teacher. Teachers were observed to down-play particular working theories and choose not to document ideas in assessments if they felt their own professionalism or perceived image of themselves as a teacher were the gaze of the child's developing opinion. Alternatively, adults generally appreciated children's thinking if they were complementary to their existing images of themselves and the work they valued (Areljung & Kelly-Ware, 2017). Teachers are in a position to select; interpret, and choose which theories they engage with and document.

The New Zealand Ministry of Education engages the Education Review Office (ERO, 2007) to visit and audit early childhood centres. Findings from ERO (2007) have highlighted the need for teachers to have more guidance and support in the identification and exploration of children's working theories. For example, they wrote:

> "Where ERO found very poor practice [in assessment], there was very little evidence that interactions between educators and children extended and supported the development of children's language, understanding and thinking and other interpersonal skills" (2007, p. 36).

Additional studies have highlighted teachers struggle to identify, highlight and use the socio-cultural 'learning story' (Carr, 2001) approach to working theories. For example, Poplur (2004) and Blaiklock (2009) suggest that 'learning stories' as an assessment model on its own does not enable teachers to assess and extend children's cognitive thinking. Both studies highlight the learning stories framework for assessment being entrenched in the formation of relationships, participation and engagement with others, often excluding any form of cognitive thinking or development in working theories. Arguably, if teachers have insufficient frameworks to make sense of children's working theories, this may lead to a void in relation to children's learning opportunities and consequently, in their assessments of children's progress.

2.7 Critique of socio-culturalism and working theories

The proposal to consider a schema learning lens alongside the socio-cultural lens (Carr, 2001) of learning in the early childhood context is contentious due to its constructivist origins. The learning story/assessment model currently focuses heavily on the development of learning dispositions which are valued equally as working theories within *Te Whāriki* (Ministry of Education, 2017). However, Poplur (2004) and van Wijk (2006) argue that learning dispositions and schemas are not

the same thing and are therefore not in competition with each other. Poplur (2006) suggests that dispositions are tendencies or actions children are 'inclined' to do and are not able to be used to 'interpret' children's thinking. Within constructivist theory, schemas are deemed to be a cognitive process while dispositions are a learned attitude or preference. Athey, (1990) and Meade & Cubey, (2008) were particularly interested in the repetitive behaviours and actions shown through children's play and investigations and how this might suggest the child's thinking. Identifying, interpreting, and extending patterns in children's behaviours (Athey, 1990) is an approach teachers can utilise to identify children's thinking schemas. This framework for identifying thinking is similar to assessment practices within sociocultural approaches of noticing, recognizing and responding for identifying learning dispositions. (Carr, 2001). However, Carr's (2001) model of narrative assessment has typically been used to identify children's developing learning dispositions and not working theories (Hedges, 2014). Therefore, this study is open to the possibilities of what schematic awareness may offer teachers socio-cultural perspectives in exploring children's learning.

According to Meade and Cubey (2008), another challenge for the implementation of schema theory to be effective in fostering learning is for teachers to have deep knowledge of particular learning areas. "Educators use effective questioning skills and sustained dialogue with children to promote problem solving and encouraged them to share their views and theories of the wider world" (2008, p. 35). This is to ensure rich engagement with children's schemas and working theories to explore concepts and ideas (Meade & Cubey, 2008). Interactions need to involve the language of the child's schema to extend their thinking and challenge their ideas. Athey (1990), Bruce (2005), Cubey (2007), Meade and Cubey (2008), Nutbrown (2006), Poplur (2004) and van Wijk (2008) all agree that schemas constantly change and evolve over time, especially as the learner matures and

becomes more able to discuss their thinking out loud. According to Athey (1990), a change in schema could be due to the reconstruction of children's theories of the world and may enhance or change their existing schema.

2.8 Section 3: Contemporary approaches to children's thinking: Schema and working theories

There are several studies that advocate for a model of learning which brings together the cognitive constructivist theory of schema and socio-cultural theories of working theories (Athey, 1990; 2007, Bruce, 2005; Cubey, 2007; Meade and Cubey, 2008; Nutbrown, 1999; Poplur, 2004 & van Wijk, 2008). Such studies highlight the ways in which teachers can use both approaches to enhance opportunities for learning, thus providing important context for this thesis and its focus on whether engaging with theories from both approaches might strengthen teachers' perspectives and understanding of children's working theories. If teachers were able to identify the patterns a child might be exploring using a schema lens, these understandings may enable teachers to have more confidence to understand the importance in focusing on working theories.

> "Patterns can be defined as any sequence of events in time and space. In other words, patterns can apply to dynamic sequences of action as well as static configurations. Patterns of either type in the brain can correspond with, or be discrepant with, dynamic or configurations patterns in the environment. Aspects of environment provide either a match or a mismatch with inner patterns" (Athey, 2007, p. 48).

A contemporary approach to utilising Piaget's constructivist theory (1950) within socio-cultural approaches (2014; 2017) has been explored within the following study. Lovatt and Hedges (2014) argue that when teachers evoke Piagetian ideas of equilibrium and disequilibrium alongside socio-cultural approaches, this adds richness to children's existing working theories.

> "The Piagetian notions of equilibrium and disequilibrium have been largely overlooked as Vygotsky's socio-cultural theory and subsequent contemporary theories

> have become foregrounded in understandings of children's' cognition and interpretations of *Te Whāriki"* (Lovatt & Hedges, 2014, p. 922).

Piaget's (1950) concepts of equilibrium and disequilibrium contribute to the process of children's development of schema. Disequilibrium is recognised as important as it challenges existing schema and causes discomfort or confusion because of cognitive challenge. Then, as the child adapts and makes sense of new information, new learning occurs, the child returns to a state of equilibrium and the adaptation or change of schema. However, while Lovatt and Hedges (2014) study highlights the importance of Piagetian concepts of disequilibrium and equilibrium, the narrow focus on these two concepts alone is insufficient to fully understand children's thinking from a constructivist perspective. Engagement with Piaget's wider theory of constructivism is necessary to understand schematic learning.

Neo-Piagetians Anne Meade and Pam Cubey (2008) drew from Chris Athey's (2007) original and seminal work on schema identification. They conducted their own research with the addition of the research done at the *Centre of Innovation at Wilton Playgroup,* when they wrote the book '*Thinking Children'* in 2008 focusing on schema. Meade and Cubey (2008) used Piaget's term 'schema' to draw attention to labeled, observable linked patterns in children's behaviours that might indicate possible thoughts and themes in thinking. Schema represents a child's internalised thinking, or as Chris Athey stated "a pattern of repeatable behaviour into which experiences are assimilated and that are gradually coordinated. Co-ordinations lead to higher-level and more powerful schemas" (Athey, 1990, p. 50).

Meade and Cubey (2008) suggest children's schematic behaviours can be associated and labeled into ways to assist teachers and parents in their identification and assessment. For example, children can be exploring thinking patterns or 'schemas' such as behaviours in, for example: transporting, transforming, rotation and circles, trajectory, enclosure and envelopment, connecting and disconnecting (England, 2018). Further reference will be made to these schemas as they were used and explored further in this research project with participants. For now, it is significant to note that each of these schemas can be of assistance to adults as they observe and work with children over time, particularly in the context of connected and repetitive actions and behaviours (England, 2018). Athey (2007) suggests that such investigations can indicate a child's ongoing thought process, an internal cognitive query, to which they repetitively return and try to understand through their own exploration. Work at the *Wilton Playcentre* (van Wijik, 2008) focused on working within the current framework for assessment as learning stories (Carr, 2001) and schema learning theory. Their findings indicated that through using the additional framework of schema in their socio-cultural approaches, teachers were more able to engage directly with children's interests and develop ways of extending their ideas. "Informed educators and parents buzzed with ideas for additional opportunities for children to be able to repeat their schemas of action" (Meade & Cubey, 2008, p. 87). In this study and others, it was found that schema learning theory can enhance socio-cultural strategies for learning and assessment. Schema can be used to extend thinking through interactions and use of language associated with the children's specific schemas (Athey, 1990; Bruce, 2005; Meade & Cubey, 2008; Nutbrown, 2008). Athey (1990) advocated that children with similar schematic patterns of learning should be encouraged to work together to enhance and challenge each other's thinking, bringing both schema and socio-cultural approaches together. Research from Bruce (2005), Meade and Cubey (2008) and van Wijk (2008), also provided

evidence that using schema for children's assessment and planning is possible through clustering children together who are involved in similar schemas for providing provocations and revisiting.

In the reviewed literature, authors suggest that schemas linked to domain learning areas such as mathematics, science, and literacies, extend children's cognitive thinking in particular learning areas, knowledge and processes (Athey, 2007; Poplur, 2004). In an example from the Froebel Project (Athey, 2007), a researcher from the project visited children in a Year One primary school who had been extended within their early years in the schema of rotation. The researcher was there to observe schematic behaviours in children in their early year's experiences. This is what was recorded "...a videotape was made of a five-year-old boy, Tom, who began a conversation with his teacher: 'Do you know that the earth goes round the sun in little balls?' The teacher made a fist and said: 'Suppose this is the sun, show me what you mean'. Tom made a circular and rotational movement with his finger around the fist. He proceeded to talk about night and day and the seasons with a high degree of accuracy" (Athey, 2007, p. 188). This example suggests that early engagement with a particular action such as rotation, may have the capacity to encourage deep, abstract engagement and cognitive processing of how aspects of the world works. In other words, an example of how a 'working theory' can be constructed.

Athey (1990), Meade (1995), Poplur (2004), Bruce (2005), Nutbrown (2006), Cubey (2007), Meade and Cubey (2008), and van Wijk (2008) studies have all demonstrated how schema theory and sociocultural learning and practice can complement each other, recognising the socially constructed and contextual influences on children's learning (Poplur, 2004). Both approaches focus over time, on engaging with the child as an active learner, children's passions and interests are what motivates

them, reflective of the aspirations of *Te Whāriki* (Ministry of Education, 2017). While Poplur (2004) and Blaiklock (2009) suggest that learning stories do not enable the identification and extension of children's thinking processes, together with schema theory there are further possibilities, particularly for developing teacher confidence with working theories.

Further research conducted by Bruce and Meggitt (2006) and Nutbrown (2006) have found that children benefit from the combination of both theoretical approaches as children learn complex cognitive thinking processes and knowledge through collaborative, contextual, relationship-based experiences. Recent research and literature reviewed here confirms that neither one assessment approach on its own is considered sufficient, alternatively on the contrary, this research review purports that together schema learning theory and socio-cultural theory can extend children's thinking and learning to a deeper level (Athey, 1990; Bruce, 2005; Bruce & Meggitt, 2006; Cubey, 2007; Meade & Cubey, 2008; Meade, 1995; Nutbrown, 2006; Poplur, 2004; van Wijk, 2008). The confluence of both approaches offers a richness of learning possibilities compounding the motivation for more teachers and centres to consider what schema theory may have to offer them in current practice. This is a significant body of research that platforms the key conceptual constructs of this study.

2.9 Conclusion

This chapter was presented in three sections. The first section presented a conceptual framework for the study, considering the historic and more contemporary theories of learning that have underpinned early childhood education in Aotearoa New Zealand. Sections two and three provided an overview of research such as that of Chris Athey (, 1990; 2007), Anne Meade and Pam Cubey (2008), Helen Hedges (2012, 2014) and others who are critical to conceptualising the development

of this study. This review has situated this thesis within the context of influential contemporary theorisations of cognitive constructivism and the potential these offer for future teacher practice in identifying children's working theories. From this critique of both the conceptual literature and empirical fields of research the key research question is: "How can theories of cognitive constructivism (schema) and socio-cultural theories influence teachers' perspectives when identifying children's working theories?"

In the following two chapters the research design, theoretical framework and methodology for the research is presented.

Chapter Three: Methodological Framework and Research Design

3.1 Introduction

As outlined in Chapters One and Two, the purpose of this study was to explore teachers' perspectives of children's working theories in early childhood settings through exploring schema learning theory in Aotearoa New Zealand (Athey, 2007). To achieve this purpose, a specific methodological framework was chosen and is outlined here in Chapter Three. Chapter Four will then provide a detailed overview of the methods, employed for the research in keeping with the theoretical constructs of the methodology, including the process of participant recruitment, methods for data collection, and the methods of analysis that led to the findings. A description of the ethical procedures adapted for the study follows.

The individual and collective perspectives of the teachers in this study were of interest and therefore, dictated a socio-cultural and qualitative direction for the research design, and methodology framework. The research design for this study was chosen from a qualitative and interpretive epistemology, underpinned by the theoretical framework of Symbolic Interactionism. Epistemology is an area of philosophy concerned with studying the nature, limit and justification of human knowledge (Hofer & Pintrich, 1997) and refers in particular to how knowledge is acquired and validated (Crotty, 1998). Many epistemological paradigms exist, ranging from Positivism to Interpretivism. Interpretivism frames the shaping of this study and within Interpretivism of the three philosophical paradigmatic possibilities, socio-cultural constructivism has been chosen for this study. Socio-cultural constructivism is a plausible fit for this study compared to constructionism and social constructionism, as this research is interested in each teacher's unique perspectives on the research questions based on their experiences,

interpretations, and understandings, within the socio-cultural contexts of early learning in Aotearoa, New Zealand.

Engaging with a socio-cultural, qualitative ontology was selected to enable a context for the study in which participants were familiar; that being, an environment where collaboration, reflection and discussion is their lived experience as teachers. The socio-cultural theoretical framework of Symbolic Interactionism ensured that participants could explore and make meaning significant to them within their learning community. In other words, the study provided a research space conducive to a safe, responsive and comfortable environment for participants to engage and explore new ideas and understandings. Therefore, the theoretical framework and research design were critical in creating a familiar context for this to occur. This sentiment that values an epistemological view that all knowledge is derived from practice and reality through research is endorsed by Crotty in his words: "all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world and developed and transmitted within an essentially social context" (Crotty, 1998, p. 42). Within such an epistemological viewpoint the theoretical framework of Symbolic Interactionism sits comfortably as it is designed to invite participants, such as the teachers in this study, to actively create meanings, actions and reflections through individual and collaborative critical conversations that reveal their social cultural, and personal values and perspectives in relation to the key research question.

3.2 The theoretical framework, research design and methodology of the project

The following table provides a visual reference and overview of the components of the methodological framework of the research project:

Table 1. The research design and methodology

Epistemology/Ontology The use of a constructivist epistemology to investigate perspectives allowed the researcher to question culture customs, traditions and habits through which teachers construct meaning and how they "hand on (their) understandings as quite simply 'the truth'" (Crotty, 1998, p. 59).	Social Constructivism/Qualitative The constructivist paradigm allowed the researcher to construct meaning and understanding through a process of reflecting on and interpreting individual participants actions and interactions from the viewpoint of an insider Individuals construct knowledge through interactive internal and external learning experiences (Crotty, 1998).
Theoretical position The interpretivist theoretical perspective, particularly Symbolic Interactionism enabled the researcher to build relevant and meaningful understandings of the perspectives of the participants; practices that are deeply embedded in culture or tradition.	Symbolic Interactionism Individuals experience reality uniquely and construct meaning through interactions with the "objects" of that experience (Mead, 1934).
Methodology Design A qualitative framework was adopted to enable the researcher to explore the research question and develop a detailed understandings of the central phenomenon using interpretive methods of data collection and analysis to understand the lived experience of the participants	Qualitative/Social Constructivist/Interpretive Theory emerges from the data through a process of constant comparison and thematic analysis and the generation of propositional knowledge (Miles and Huberman, 1994)
Methods The data collection methods were designed to portray the perspectives of the participants' worldview and meaning making and allows their voices to be heard in the socio-cultural settings of their professional work.	**1.Four semi-structured group interviews** of two-hour visits in each setting over ten months. Interviews were recorded and transcribed by myself. The number of participants across the group interviews was seven, including myself as researcher. **2. Journal reflections:** Between each semi-structured interview, teachers were asked to make individual journal responses and reflections to then share at the next group interview (approximately once a fortnight).
Data Analysis The analysis of the data ensured the generation of propositional knowledge on which to base theory building (Crotty, 1998), and the original contribution of new knowledge because of this research.	Coding/Thematic analysis/Document analysis **1. Document analysis:** Teachers were asked to document observations and write assessment/learning stories on their target children in their early childhood settings to discuss and share at interviews. Through exploring and discussing journal reflections and document analysis of children in learning stories, teachers were able to have ongoing informal discussion in their perspectives of schema and working theories. **2. Data reduction and analysis:** Interpretative, thematic analysis and data reduction (Miles & Huberman, 1994).

As outlined in the table above, this research took a qualitative, social constructivist epistemological positioning, informed by the theory of Symbolic Interactionism (Blumer, (1969). Implicit in this design was the use of interpretive methods of data collection and analysis. A qualitative research epistemology and subsequent methodology provided a framework of investigation critical in gathering the perspectives of teachers; to explore teacher perspectives in children's thinking in their learning. Qualitative research is post-structural, symbolic and focused on the construction of 'meaning'. This study enlisted a social constructivist and interpretivist ontology to probe, reveal and understand the social reality and experiences of the participants.

This research draws on cognitive constructivist and social constructivist theoretical approaches as the conceptual underpinnings of the study as detailed in Chapter Two, as both are needed for the research. Cognitive constructivism is the theory of learning underpinning schema learning theory, which refers to the cognitive process of acquiring new knowledge and understandings (Piaget, 1950). While social constructivism is the theory underpinning the socio-cultural theory of working theories; it also highlights the cultural and social nature in which these understandings are acquired (Vygotsky, 1930; 1935). Miles and Huberman (1994) suggest qualitative approaches to research are a process in understanding, embedded within a particular context, rich in people's own lived experiences. Miles and Huberman (1994) further state "Qualitative data, with their emphasis on people's 'lived experience', are fundamentally well suited for locating the *meanings* people place on the events, processes, and structures of their lives: their 'perceptions, assumptions, prejudgments presuppositions' (van Manen, 1977) and for connecting these meanings to the *social world* around them" (p. 10). Qualitative and interpretivist research generates a rich narrative of human existence and meaning, derived from the understandings and diverse experiences within the participants in the

study (Miles & Huberman, 1994). As Miles and Huberman (1994) have outlined above, a qualitative framework for this research was critical to explore the participants as they made meaning of new understandings in context of their thinking. Likewise, Mitchell and Edugo (2003) suggest, methods within qualitative research make sense of an individual's knowledge and understandings, highlighting the way in which people create meaning in their lives as narratives of personal experiences are reflective of the context and culture of the participants. This process of participants meaning making within the complex contexts of early learning are central to this study's research design.

3.3 Theoretical framework - Symbolic Interactionism

Symbolic Interactionism along with social constructivist theories of teaching and learning highlight the importance of participant meanings and interpretation that individuals bring to social realities (Nuttall, 2004). Symbolic Interactionism was chosen for this research as the framework as it engaged the participants in making sense and meaning of the research problem, as individuals and a group. Symbolically, meaning making occurred through shared language, exploring existing frameworks of thinking in teaching and learning and robust professional relationships. According to Oliver (2012) this approach is grounded in inquiry, and context and reflects complex phenomena.

The term 'Symbolic Interactionism' was originally developed by Herbert Blumer (1969) who, in his work, argued that people interpret and act towards things based on the meaning they have for them (Blumer, 1969). Secondly, he suggested meaning is distinguished through social interaction with others and through self-interpretation, which ultimately leads to action. 'Symbols' are thought to hold meaning and abstract thought, that is, meaning for objects which might have social or

emotional value. Symbols can include physical objects but also hold more abstract meaning related to history, language and emotions (Blumer, 1969; Bert, Adams & Sydie, 2001). Symbols therefore hold different meanings for people and can be explored through the process of social interaction. George Mead (1934) suggests that some symbolic language can draw similar meanings for people, for the meaning of 'cat' or 'dog' for example. Symbols such as language create opportunities for 'thinking' or as Mead (1934) would suggest, thinking as talking to others, an important concept for this research. Mead (1934) argues that talking and thinking with self and others is behaviouristic, where the role of symbols enact interaction. People interact with each other through gestures and language (symbols) as this has symbolic meaning. The significance of Mead's notion of interaction was core to our research community as will be discussed in the following chapter.

Herbert Blumer and George Mead were students of John Dewey in the 1920s (Dionysios & Dionysiou, 2017). Dewey's early analysis of the mind as a 'thinking process' had a major contribution to the later work of Mead and Blumer on symbolic interactionism (Nuttall, 2004). Dewey suggested the mind processed stages of making sense of the world, then deciding and filtering responses and appropriate types of action. He suggested individuals engage in processes of defining their responses to others, either accepting, rejecting or modifying their thinking, therefore defining their own 'norms' according to their own beliefs (Dionysios & Dionysiou, 2017). The data presented in the following chapters reflects this very process as the research community debated the concepts central to the key research questions. Mead's development of the theory of symbolic interactionism situated it within pragmatism and psychological behaviourism, focused on external influences on individuals' behaviours. Mead (1934) suggested it is the larger community itself which influences and controls individuals' thinking and responds to their own world. This would

dictate that any meaning developed towards ‘symbols’ in an environment should be universally interpreted. However, Dewey's (Dionysios & Dionysiou, 2017) pragmatic view of symbols suggests meanings are objective and attached, dependent on how the individual is likely to interpret it. Dewey challenges Mead’s (1934) thinking when he argued that meaning making attached to symbols is not universal due to the role individuals have in deciphering and choosing how to respond to their own environment as a ‘free agent’, not someone whose thinking is controlled by societies existing norms. Again, this is a highly valued proposition that guided the shaping of the research data collection and analysis in this study as every participant perspective was valued and recognised as socially and culturally embedded and as such, may differ amongst colleagues and participants.

George Mead (1934) purported that the thinking individual was a result of experiences within a social group. In other words, human acts are influenced by the gestures of those in a social group and are symbols of communication and language which respond to a particular or portrayed meaning. “Human beings act towards things on the basis of the meanings that these things have for them” (Blumer, 1969, p. 410). The development of self, according to Mead (1934), is the ability to put oneself into another's place; where individuals can reflect on themselves as others might see them. This requires an awareness of self and an ability to get outside themselves, to evaluate self and to see themselves objectively.

While Mead (1934) suggests individuals cannot experience themselves directly, through putting themselves in the position of others, they are able to view themselves. Therefore, Mead (1934) would argue that individuals are heavily influenced by the relationships held with others, and

through learning to be subjects, and objects, and seeing how one is perceived by the 'generalised others,' allows for objectivity. "People need to be able to evaluate themselves from the point of view of the generalised other and not merely from the viewpoint of discrete others" (Mead, 1934, cited in Dionysios & Dionysiou, 2017, p. 33). As the analysis chapters will show, the perspectives of the participants in the study evolved over the time of meeting together as they engaged in not only the articulation of their perspectives but the ongoing critique and evaluation of their thoughts, values and actions as a research community.

Nuttall (2004) more recently described symbolic interactionism as a pragmatic theoretical perspective as it reflects individuals' everyday realities through ongoing social construction. Included within this idea and consistent with the thinking of Blumer (1969), as a person interacts with others, they then interact with themselves to decide on a particular future action. In other words, an individual's 'reality' is constructed through their experiences and interactions with others; that is, developing from the actions of others. Some of the final sentiments of the participants in the closing phase of the study capture this proposition despite the data being collected some 60 years after Blumer's original work. Hedges (2007) further suggested that symbolic interactionism engages with a process of 'thinking' and through the social process of making 'meaning', involves putting oneself in the role of another dependent on which fits with us best through defining how we view ourselves and our perceptions of reality.

Mead's (1934) ideas shaped the key underlying constructs for this study. According to Mead (1934) to have a sense of 'self' one must be part of the attitudes common to the group, as it is through the social process that the group influences the individual.

3.4 Mead's 'Social Processes' in Symbolic Interactionism

Mead (1934) portrayed the human mind as a 'process' and not a 'thing,' in other words, the mind is developing *within* a social process. The social process precedes the mind, is not a product of the mind, but instead, Mead (1934) argued, the self becomes a product of the social processes through interaction with others. The complexity of the social processes is central to Mead's work and is illustrated graphically below.

Table 2: Reflects an overview of the researcher's interpretation and intended implementation of Mead's work in this research:

Table 2. Mead's Social Processes

Symbols	Meaning Making	Thinking	Communication
Language	Experience	Mind	Interaction
Gestures	Objectivity	Self and others	Talking and listening

This framework suggests there are many interconnected 'social processes' in making meaning for self and with others, as people engage together. Mead (1934) suggests that when research is framed within symbolic interactionism, participants need to engage with all elements in Table 2, as concepts are interlinked and can create opportunities through 'social processes'. The framework asks participants to consider questions such as: 'What is happening here?' and 'How do teachers make sense of their work?' (Nuttall, 2003). Engaging with the social processes within symbolic

interactionism enables teachers to think and make sense of their world through symbolic social exchanges which are subject to constant change. Symbolic exchange involves a process of active construction of knowledge through social interaction and developing meaning. Teachers develop understandings about themselves and others through symbolic interactions, language, gestures and written materials. According to Nuttall (2017), individuals rely on interactions which bring value to the image we perceive ourselves to be in the eyes of others. Through language and changes in behaviour, we can moderate our interactions accordingly to perform tasks which reinforce a desirable relationship, therefore actively reinforcing to ourselves the ways in which we are viewed by others. Such an approach was critical to this particular study as the participants' ideologies, actions and behaviours were essential when thinking about interpreting and understanding a range of approaches to children's learning and thinking. This had implications for the collection and analysis of the data that underpined the research findings reported in Chapters Six and Seven of this thesis.

3.5 Symbolic Interactionism and this study

Hedges (2007) suggests that not 'one' research method exists, rather an approach is often influenced by a range of methods that the researcher feels comfortable with and also is able to address the research aims of the study. According to Cohen et al. (2013) interactions make up a society and societies are made up of the social interactions within it, reflecting the dynamic active ways of being human. In other words, groups of individuals can negotiate a range of meanings or shared perspectives through regular interactions. A unique aspect of symbolic interactionism is the emphasis on 'thought', that is the 'thinking' or meaning which can be expressed through particular behaviours or through verbalisation. This discourse of 'thinking' is also central to the cognitive constructivist theory of schema learning theory proposed in this research as a theory applied to the

ways in which teachers can notice and respond to children's thinking in their work. Working with practitioners using a symbolic interactionism approach engaging with thinking, assisted the overall research methods which reflects a similar focus on 'thinking' and working theories with children.

This research approach was seeking the perceived reality, or perspectives of the participants lived experiences and therefore, did not support any predetermined category or preconceived ideology. Symbolic Interactionism encourages research which highlights complexity, the unknown and the impossibility of universal truths (Bert, Adams & Sydie, 2001). Language, action and thought are 'symbolic' of the experiences and perspectives of the participants in this research so cannot be representative of any notions of universal truth. Interaction within shared symbols, language, action and thought is a dynamic and constructive process, highlighting the evolving nature of developing meanings reflected in the relationships between subjects and objects, which develop as 'social realities' (Polk & Polk, 2017; Snow, 2001). Meaning is therefore an expression of feelings, memories, ideas, attitudes into a perception of a situation. Therefore, language and behaviour used by participants is symbolic of the ways in which they relate to each other, understand each other and themselves. Nuttall (2017) suggests particular people have a stronger influence than others on the ways in which we want to be viewed as teachers, which creates an image of what we might choose to live up to. Individuals rely on interactions which bring value to the image we perceive ourselves to be in the eyes of others. Through language and changes in behaviour, we can moderate our own interactions accordingly and to perform tasks which reinforce a desirable relationship, therefore actively reinforcing to ourselves the ways in which we are viewed by others. Views of self and others are therefore constructed through Symbolic Interactionism.

Cohen (et al., 2013) further suggests Symbolic Interactionism is a naturalistic method of qualitative research as it aligns effectively with classrooms and school contexts as the researcher has a limited impact on the natural situation. This research aimed to create a similar context for the study over a sustained period through a systematic method of inquiry, through being reflexive and responsive to a range of possibilities (Miles & Huberman, 1994). Denzin (1989, in Flick, 2006) raises a challenge within this type of methodology highlighting the tension between whether researchers should focus on individuals developing meaning and/or the process of making meaning through interactions with others. However, arguably, Symbolic Interactionism infers a balance of both methods as the individual comes to the collective with their own cultural capital, while at the same time infers meaning from those around them (Nuttall, 2004). Therefore, Symbolic Interactionism offered this research an appropriate framework to explore the perspectives of teachers identifying children's thinking from both an individual and collective perspective. Symbolic Interactionism was a useful approach for analysing and interpreting the ways in which together, individuals develop meanings in their lives and their professional work.

An aim of this research was to engage in an in-depth qualitative and interpretive study, exploring and interpreting participants' experiences when exposed to specific theoretical frameworks aimed at engaging with children's thinking through schema learning theory and socio-culturally based learning. This study ultimately engaged with a range of symbolic and interpretive understandings gathered by the participants and how said understandings contribute to their everyday practices. Such a process could only occur within a context of shared language, meanings and understanding. The social constructivist approach highlights the cultural and social nature in which these understandings are acquired. Interpretivism reflects a perspective on reality where knowledge is

understood as influenced by prior experiences and understandings individuals have of their world (Scott, in Wyse, Selwyn, Smith & Suter, 2017). In other words, Scott, in Wyse et. al. state "(Interpretivists) focus on the meanings that social actors construct about their lives and in relation to the world and argue that human beings negotiate these meanings in their social practices" (2017, p. 246). This study was shaped by this interpretivist orientation to research through not only its socio-cultural lens, but also due to its alignment to the key purpose of the research; to capture the perspectives of the participants as they negotiate meaning both individually and collectively in regards to their social and professional practices in relation to children's thinking and learning. Critics of Symbolic Interactionism draw from more traditional positivist assumptions relying on the perceived probability of particular 'truths'. In seeking truth, positivists rely on scientific methods of observation, objectivity and confidentiality within data gathering, dissimilar to the approaches suggested here relying on symbolic language and dialogue for data. Positivists look for probable truths and would suggest truth becomes distorted through language and interpretation, therefore, losing validity in the data. However, a research method which collects data to establish 'one truth' is not the right fit for this research. This research aims to explore a range of 'truths;' as being human suggests that all participants behave or act in relation to the truth they believe. In other words, through our own engagement, human beings reflect their own realities and truth (Blumer, 1969; Oliver, 2012). Within this research method and approach, teachers and researchers are able to interpret the significance of individuals' experiences and establish the meaningfulness of their own 'truth.' This will become evident in Chapters Seven and Eight. Denzin (1989) further raises a challenge within the Symbolic Interactionist methodology highlighting the tension between whether researchers should focus on individuals developing meaning and/or the process of making meaning through interactions with others. However, arguably, Symbolic Interactionism should include a

balance of both methods as the individual comes to the collective with their own cultural capital so the importance of the participants developing understandings will come from an individual and social constructivist perspective (Nuttall, 2004). A method of non-structured interviewing is essential to explore and interpret understandings and therefore, played a significant role in the methodology of this project.

The qualitative interpretivist research design and framework adopted for this study recognises the unique context of the research, therefore research findings will be context specific, unique and transformative within a particular landscape, constructed by the individuals within groups (Miles & Huberman, 1994). This research was designed to interpret the perspectives of teachers who were experienced practitioners. The reason being that experienced teachers had the time to explore, critique and practice current theoretical and pedagogical discourse in early childhood education in Aotearoa New Zealand.

Due to the nature of qualitative, interpretative research, ~~myself as~~ the researcher is prone to introduce pre-conceived notions to the interviews and conversations, shaped by personal experiences, motivation and professional beliefs that may have an influence on the research process. In keeping with the principles inherent in the theoretical framework of the study as researcher, it was essential to ground the reality of the project within the focus of the perspectives of the participants. To do so, it was incumbent on the researcher to maintain a position of balance, taking turns to internalize participants perspectives and concurrently to consider these perspectives deeply as they developed over time and within in the broader contexts of early childhood education in Aotearoa. This positioning of the researcher was

important to ensure collectively we were able to explore a range of perspectives and meaning that were the core foci of the research design and articulated clearly in the research questions. The authenticity of the data generated through this type of methodological approach requires the researcher to "consider how their own unique positionalities inform the research process" (Jamieson, Govaart, & Pownall, 2023, p. 1) and this was pursued diligently throughout the study.

Through language, observation, social interaction, and dialogue with the participants, their everyday lived experiences were explored in complexity. As Symbolic Interactionism is not trying to unravel a particular 'truth,' the theoretical foundation and methodology for the study ensured the researcher was able to respond to the direction of the research and inquiry that teachers chose to take. This discourse of responding to the direction of the inquiry, learning or interest of the learner was very familiar to early childhood teachers in Aotearoa New Zealand. Early childhood teachers use a discourse of responding to learners and learning in their practices with children and is considered, current practice. As Symbolic Interactionism presents a similar discourse in thinking, this known pedagogical strategy was very useful in deciding which theoretical approach to take for the study. This is 'known' due to the nature of the relationships, teachers' experiences and understandings deemed shared between researcher and experienced teachers in early childhood education. Through creating a similar environment involving teacher experience in 'known' discourse, the participants were enabled to understand themselves as they engage in the modification of their own thinking and interpreting particular understandings or situations of others with similar understandings.

3.6 Summary

Chapter Three provided a justification and overview of the research methodology design in qualitative, interpretative ontology, with a theoretical framework in Symbolic Interactionism. Postmodernism and social constructivism informed the theoretical framework for this study, rich in teacher narrative, symbolic description and analysis. Social constructivism underpinned the research design as it validates knowledge situated within the context of social interaction. With this research design, reality and 'truth' were explored within the teacher's naturalistic environment, capturing rich data from social and cultural experiences, and reflecting the reality of experience (Mitchell & Edugo, 2003). Narrative and Symbolic Interactionism interpreted the complexity of teachers' feelings, experiences and understandings, symbolic of the nature of social constructivism (Mitchell & Edugo, 2003).

This research aimed to lead participants through a method of inquiry into practice, not in a systematic manner but through being reflexive and responsive to a range of possibilities (Hedges, 2007). Exploring dialogue is symbolic of participants' truths and understanding of their own reality and is a critical method within a qualitative approach to research. Engaging in regular dialogue creates opportunities for shared understandings and new meaning through interpretation.

3.7 Introduction to chapter four - Methods

A theoretical framework in Symbolic Interactionism involves creating a methodology rich in qualitative methods of research and data collection. Chapter Four captures the epistemology of the research design and theoretical framework into a series of qualitative methods.

This chapter describes and outlines a series of three phases in the research methods. Each phase involved a series of semi-structured group interviews, discussions and journaling opportunities for individuals to respond to readings, discussions and work with children.

The three phases are:

1. **Phase One** - Exploring the perspectives of teachers in their current practices in teaching and learning

2. **Phase Two** - Introducing an opportunity in professional learning to revisit current theories in socio-cultural teaching and learning and, cognitive constructivist theory in schema learning theory; and

3. **Phase Three:** To capture teachers' perspectives as they make sense and meaning of schema learning theory alongside their current practice in socio-cultural theory

Chapter Four continues with a rationale for selecting methods used in the research and data collection. The remainder of the chapter describes the process for the recruitment of participants and gives an overview of ethical considerations that were approved at the outset of the study.

Chapter Four – Methods

4.1 Introduction

Chapter Three outlined the methodology, research design and the theoretical framework of Symbolic Interactionism. Critical to the methodology in this project was a process which captured participant construction of knowledge, understanding and meaning making; as a symbolic, social and cultural process (Nuttall, 2004; Rogoff, 2003). As explored in Chapter Three, this research project needed to foster an environment for social inquiry through processes of shared language and understandings, meaningful to their teaching and learning contexts of children's learning.

Chapter Four presents a rationale for the methods selected for the study, outlines three phases of research and data collection for analysis. The chapter further outlines the process for the recruitment of participants, my role in the research and finally, examines ethics relevant to the data collection and working with participants.

4.2 Rationale for methods of data collection and analysis

According to Mitchell and Edugo, (2003) methods within qualitative research make sense of individuals knowledge and understandings, highlighting the way in which people create meaning in their lives, as narratives are reflective of the context, culture and personal experiences of the participants. To achieve this, the method of 'researching from within' rather than 'researching about' was used to encourage a balance of research-based practice. Nuttall (2004) places importance on the notion of 'subjectivity', in other words, how we tell stories about ourselves reflects who we think we are. In this research environment, participants and I all contributed to and

reflected on each other's thinking and, on our own individual sense of self. This approach requires participants to ask:

- What influences teachers in the way in which they view themselves?
- Are their views influenced by their childhood, teacher education training, or being a parent?
- How do teachers view their own practices within the ways in which they think their own practices are viewed by others?

Experience contributes to the overall self-identity of a teacher, and it is these understandings of 'self' which play out in their role as teacher.

Because early childhood teachers work alongside each other in teams, to be able to have any substantive impact on their practice the research methodology needed to explore how these teachers worked together, viewed their own and others practice when working with the children in their individual settings. Hedges (2004) suggests Symbolic Interactionism engages individuals together within the social process of making meaning which involves putting oneself in the role of another dependent, ultimately defining how we see ourselves and our perceptions of reality. Taking a symbolic interactionist view of self is influenced by how one thinks others see them in their practice; where teachers are constantly analysing the practices of others in relation to their own and relating that to how they believe they are viewed by others.

4.3 Deciding on the methods

Symbolic Interactionism involves describing and interpreting the experiences of the participants within their own cultural contexts and are of primary importance to this research project (Smith, 2016). Dezin (1989) argues that a challenge for symbolic interactionists is the dilemma between the focus needing to be on the dynamic between the individual and others, or the individual and society.

Such a debate is focused on the pragmatic ideal that society has rules and boundaries that reflect an empirical reality rather than at an individual level where reality is more ideally and socially constructed.

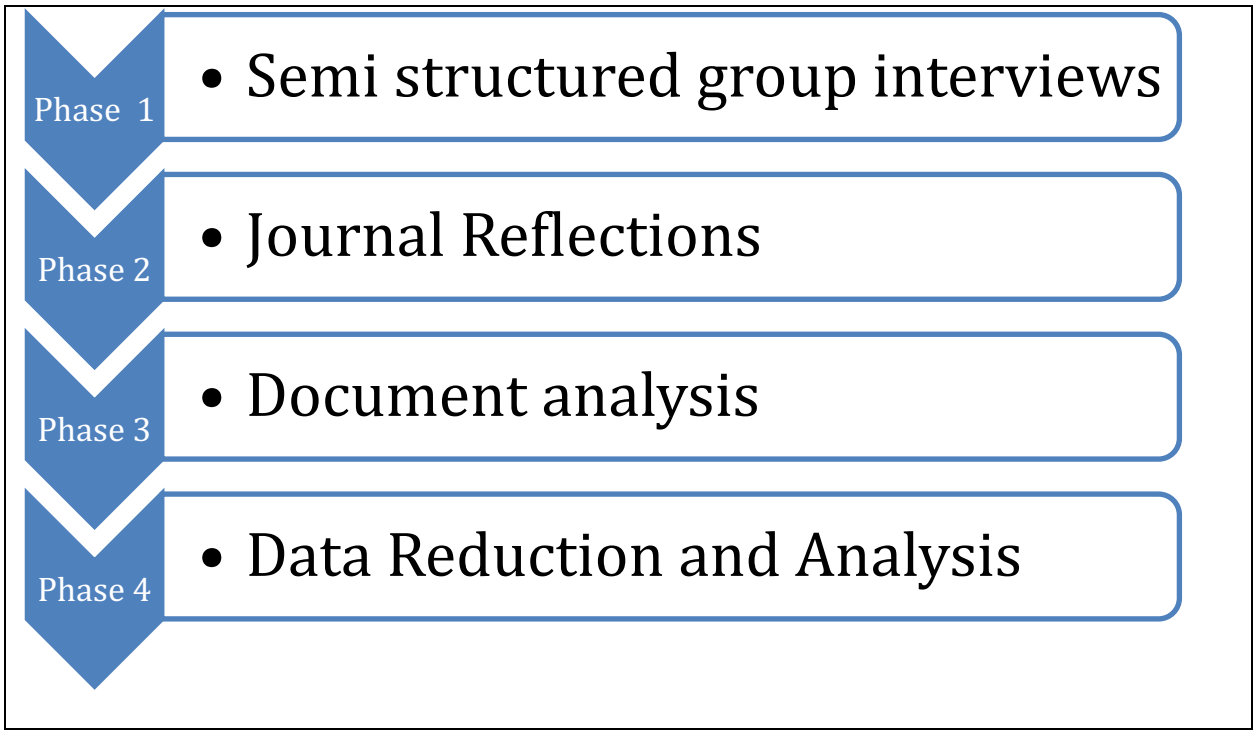
Having worked in the field of early childhood education, I was somewhat aware of the complexities teachers can experience working collaboratively in teams in a diverse education sector. As professionals, teachers bring their teaching philosophy, values, and expectations to their daily work with children and colleagues. Being an effective teacher means demonstrating a high level of engagement, participation and communication, all critical to building and maintaining relationships (Te One & Ewans, 2017). Teachers also bring much of themselves personally, their own personal beliefs, values and experiences which have all contributed to who they have become. As teams come together, teachers need to negotiate how they will collaborate in practice, to develop a shared space of respect, integrity and open communication. The logistics of teaching in teams can be challenging when faced with long days, insufficient opportunities for professional learning, large groups of children and limited non-contact time (Te One & Ewans, 2017). However, if teams can develop and maintain a supportive team environment, teachers have significant capacity to create their own microsystem of personalised learning themselves. It is within this community of learning that teachers can explore, take risks, share, question and challenge each other in constructive ways to support their own growth and development. Therefore, it was critical that this study focused on the lived experience of early childhood teachers in their own context. According to Miles and Huberman (1994) only in their own environment where everyday dialogue and interaction contributes to and builds knowledge and meaning for each teacher, could authentic qualitative research occur.

This research reflects a qualitative paradigm in social constructivism where interpretive methods were engaged to understand and explore the participants perspectives and experiences. Engagement, participation and dialogue is essential in qualitative research, therefore, the methods in this study involved semi-structured interviews, opportunities for individual and group processing of new knowledge and ideas, and personal reflection and writing in response to resources supplied. Observations, semi-structured interviews, discussions, analysis of documentation, recordings of teacher reflections and insights in staff meetings are critical phenomenographic methods to provide the qualitative data and analysis needed. Through verbal and documented analysis, teachers and researchers are able to tell their stories, and to question and broaden their thinking and meaning they take from such interactions. At the conclusion of each semi-structured interview decisions relevant to the direction of the inquiry are made collectively to follow up with particular lines of thought or action. It was important that the participants themselves had some control over the direction of the inquiry. As Brown (1992) suggested, it is through interviews and informal discussions, theorising and following up of particular ideas, qualitative approaches enable adaptations to the design of the research. The emphasis is on 'making meaning' through teacher dialogue, language and reflections on actions.

4.4 Qualitative Methods

Two teaching teams with three participants in each, fully participated in all three phases of the research. Each team of participants was interviewed as a group, with no engagement or shared findings between each team.

The research methods: The Process



The following methods were used in the study:

1. Four semi-structured group interviews of two-hour visits in each setting over ten months. Interviews were recorded and transcribed by myself. The number of participants across the group interviews was seven, including myself as researcher.
2. Journal reflections: Between each semi-structured interview, teachers were asked to make individual journal responses and reflections to then share at the next group interview (approximately once a fortnight).
3. Document analysis: Teachers were asked to document observations and write assessment/learning stories on their target children in their early childhood settings to discuss and share at interviews. Through exploring and discussing journal reflections and document analysis of children in learning stories, teachers were able to have ongoing informal discussion in their perspectives of schema and working theories.

4. Data reduction and analysis: Interpretative, thematic analysis and data reduction (Miles & Huberman, 1994).

1. Semi-structured interviews

Teachers were gathered in semi-structured interviews in each of the two sites in keeping with the theoretical principles outlined in Chapter Three. Semi-structured interviews meant that I had a prepared a broad structure and set of questions for each of the interviews. The questions were in line with the research aims but needed to be responsive to the dynamic and direction of discussion of the teachers themselves in an effort to draw on their individual and collective perspectives (Denzin, 1989; Flick 2006). This was to enable genuine engagement, meaning making and interpretation of theories, materials and ideas. Through interviews and discussions, theorising and following up of particular ideas, such qualitative approaches enabled the design of the research to be open to a degree of flexibility (Denzin, 1989; Flick 2006).

Guiding questions were necessary to stimulate discussion in the first semi-structured interview (Denzin, 1989; Flick 2006). Denzin (1989; Flick 2006) suggests however that not all pre-determined interview questions might be necessary to develop a particular line of thinking and should only be used to encourage more conversational techniques. The following is an example of some of the guiding questions used in the semi-structured interviews:

- What are your approaches and strategies when identifying children's thinking in their learning?
- What strategies do you engage with to realise these perspectives?
- What reasons do you have for these approaches and strategies?
- What are the outcomes of these approaches and strategies?

- What are you hoping to achieve?
- What reasons do you give for these expected outcomes?
- What are the conditions that promote or impede outcomes?

Further research questions included:

- What do teachers understand about the concept, theory and practice of identifying children's working theories in relationship to thinking and learning in the EC context?
- What is important for teachers when identifying children's thinking when observing and understanding children's learning?

The semi-structured interviews were held over a ten-month period. It was important to give teachers time to observe children in their centres, to read, talk and discuss with their colleagues what they were noticing and to consider their perspectives. Each of the interviews were transcribed and shared with the participants. Data from the interviews was interpreted, reduced and analysed to allow a thematic approach to findings.

1. **Journal Responses**

Each of the participants was given an A4 size journal to record their own thinking and learning through the project. During Phase Two and Three of the research the participants were given various readings relevant to the study. For example, readings and literature concerned with schema learning theory (Athey, 2007; Meade & Cubey; 2008, Kelly, 2016) and children's working theories (Hedges & Jones, 2012; Lovat, 2014; Hedges, 2014). I suggested that the readings could be done between interviews and responses recorded in their journal. At the conclusion of Phase Two, teachers were asked to observe and record children's actions and behaviours and then bring this and

their own developing perspectives to the next interview. The journal provided the participants a place for their own thoughts, ideas and perspectives and was generally well utilised as a method for qualitative data. Documented journal entries were not directly shared with other participants but acted as a tool for individual reflection and group discussion.

3. Document Analysis

A qualitative method of document analysis was included to capture the evolution of teacher perspectives, thinking and practice in written reflections and learning stories on children. As teachers are required to document children's learning via learning stories, being able to review and discuss how teachers were engaging with this process during the research period was of interest. Between semi-structured interviews through Phases Two and Three, teachers were continuing to write learning stories inclusive of their developing perspectives of schema learning theory and their current practices in bringing value to learning dispositions and working theories. Examples of learning stories, chosen by the teacher writing them, were then brought to the semi-structured interviews for observation and discussion. This served as a useful method to notice and discuss how teachers' perspectives of children's working theories were becoming more obvious in the way in which they went about noticing children's thinking and working theories. There were specific examples of teachers having more awareness of working theories in their learning stories in the data collected.

4. Data Reduction and Analysis

Data reduction and analysis is the process of examining and recognising the value of the evidence collected to address the key research question of a study (Lincoln & Guba, 1985). The design and plan for data analysis depended largely on the methods adopted and the purpose of the study. To

ensure that data collected was treated thoroughly and the conclusions drawn were authenticated, analysis of data needed to be systematic, disciplined and able to be seen and described (Punch, 2005).

The purpose of this research was to gather qualitative data on the participants' perspectives as teachers over time. Data reduction and analysis involved identifying particular themes and patterns in the data. In other words, "Eliciting the gem" (Smith, 2016, p. 303) meaning identifying patterns and themes across the participants' reflections, discussions and analysis of documents of children's learning. Within an interpretivist and qualitative research methodology, I needed to analyse the data to conceptualise and present the perspectives of the participants in a logical and compelling manner.

To explore and explain the perspectives of teachers, it was essential to analyse data using a proven conceptual framework. This study engaged with the qualitative process of 'data reduction' which refers to the "process of selecting, focusing, simplifying, abstracting, and transforming the data'' (Miles & Huberman, 1994, p.10). Data reduction encourages the analysis of data into 'chunks,' to explore emerging patterns, to summarise and paraphrase emerging ideas and interests (Miles & Huberman, 1994). Within Symbolic Interactionism, it is essential that participants had the opportunity to develop emerging patterns of thinking, meaning, and understandings over time. Therefore, data analysis occurred simultaneously with data collection to ensure opportunities for complex ideas and understanding to be explored (Lincoln & Guba, 1985). Data from each interview was transcribed by myself to guide future discussions and research questions and was shared with participants. However, full analysis of the data was only considered once all the data was collected and all methods were completed. Once all transcripts of data were analysed, particular phrases and

ideas were collected in an effort to make meaning of the participants' perspectives. I was responsible for the data reduction, organising ‘chunks of data’, and common themes. Identifying themes was developed in response to the emerging ideas within the data. The outcomes of this process will be presented in Chapters Five and Six.

4.5 Recruitment of participants

In this study I was interested in the perspectives of ‘teachers,’ referring to educated teachers with a minimum of three years teacher education with a diploma or degree in teaching. Educated teachers were important for me as their qualification meant they were familiar and experienced with Aotearoa New Zealand’s curriculum *Te Whāriki* (Ministry of Education, 2017), along with current approaches in teaching and learning which was needed for the research. To ensure a sufficient pool of educated teachers, the local community-based Kindergarten Association was the preferred cohort for this study. The Kindergarten Association governs approximately 25 kindergartens and only employs fully trained early childhood teachers. Additionally, teams of kindergarten teachers in the association are smaller i.e., only three to four teachers, all with the same conditions of employment and non-contact time. Kindergartens also have older children attending, generally between three and five years. This was an important consideration as the study was focused on teachers' perspectives on children's thinking and working theories. Therefore, it was deemed advantageous if the children the teachers were working with were of an age where they were able to articulate their thinking and possible working theories to the teachers. As outlined above, there were significant advantages approaching educated teachers in kindergartens. Therefore, to gauge a realistic number of participants for the study, it was my intention to recruit two teams of teachers from the Association, a possible pool of six to eight participants.

Approval to approach particular teams of teachers in kindergartens was sourced via Senior Management within the Kindergarten Association (appendix C & D). Letters of invitation (appendix E) were provided, and contact made to discuss the nature and aim of the study, in particular, to do with the voluntary and confidential nature of the study. It was essential that the scope and time involved in the study was clearly outlined to the potential participants. The reason for this was the study was adding to their existing workload, so participants needed to consider their professional and personal commitments over the proposed timeframe for the study. I approached two teams of teachers, discussed the research proposal and they agreed to take part in the project (appendix F). At the point of participants sighting and signing the consent for participating in the research, dates for visits were negotiated, phases for the direction of the research were outlined and methods discussed. The participants were all experienced early childhood teachers, ranging in experience from 5-10 years and fully qualified. The final number of participants who participated fully throughout the study was seven.

4.6 The role of the researcher

In alignment with symbolic interactionist and interpretative methods, this research explored the diversity of experiences, truths, realities and perspectives of practitioners. Cohen, Manion and Morrison (2013) suggest symbolic interactionism ensures a naturalistic research design as it aligns effectively with classrooms and school contexts and invites the researcher as a colleague who has a limited impact on the natural situation. Complementing the nature of this study, Denzin (1989) states “Interpretative research begins and ends with the biography and the self of the researcher” (p. 12). In other words, qualitative research has the capacity to provoke a range of diverse understandings and differences, particularly in response to examining individuals' beliefs and practices in what they do; and when exposed to new learning. As the researcher, I was particularly

interested in how the participants would not only respond to schema learning theory but also how they would respond to the methods of data collection that are aligned with the theoretical constructs of Symbolic Interactionism.

In my daily work in initial teacher education, I am embedded within the current discourses of socio-cultural teaching and learning, just as the participants in this study were, so it was important to explore the commonalities in understandings our research community collectively shared. For example, through Phase One and Two of data collection, our discussions highlighted shared language and meanings of socio-culturalism in practice and experiences of socio-cultural teaching and learning. Lincoln (2001) suggested there needs to be a commitment to collaboration and mutual respect between the researcher and participants as it takes time to build the relationship required for good research. Within an interpretative approach, the researcher must consistently reflect on their own participation (ontology) as this approach focused on outcomes which could inform change within practice, rather than focus on theory development or traditional qualitative description. This process of reflexivity is well researched, and I was made aware of the importance of reflecting on my own values and beliefs and thinking throughout the study. Jamieson, Govaart and Pownall (2023) argue: “The practice of reflexivity confronts and questions who we are as researchers and how this guides our work. It is central in debates on objectivity, subjectivity, and the very foundations of social science research and generated knowledge″ (Jamieson, Govaart and Pownall, 2023, p. 1). As a result I was continually reflecting on the question, “How am I influencing the research?” as an integral component of researcher reflexivity.

At the outset, the participants agreed in their group to explore how they individually and collectively viewed themselves within the social and cultural contexts of the study to enable the group to reach a level of intersubjectivity from which to build on. Through the process of ongoing informal discussions in the early stages of the project, our research group agreed that it was essential to understand each other, to listen to one another and, to share common and unique histories and experiences. Interpreting and listening to each other to enable dialogue to challenge, explore and to analyse the significance of emerging personal and professional understandings implicit in the research. Within this approach there was an expectation that the teachers and I would build and maintain respectful and reciprocal professional relationships, openly able to discuss, explore and critically examine individual understandings from an inclusive, confidential and trust-based environment. Therefore, my role was to engage with the participants taking an 'insider' role, utilising Mead's (1934) 'social processes' (p. 6). According to Smith (2016) however, there are challenges within this method of research such as maintaining a rigorous and systematic approach while at the same time, allowing exploration and creativity in its design. However, a qualitative method was essential in this study, as a naturalistic approach was consistent with the epistemology of this research and the theoretical framework of Symbolic Interactionism.

Within a Symbolic Interactionist method, I as the researcher, needed to consistently and methodically reflect on my own assumptions and perspectives as they developed through the project. A responsive, interpretivist role ensured opportunities to explore a range of perspectives and to enable the resistance of fixed ideas. However, Scott (in Wyse et. al., 2017) suggests that participants' perceptions are mediated by the researchers own framework of reference, which can have implications for the data. The challenge for myself was when and where to share my own

thinking, ideas and experiences, when to provoke and when to be more submissive, or to take a position or be impartial (Scott in Wyse et. al., 2017). As part of a community of learners, these decisions had to remain open and unknown due to the open-ended nature of this qualitative research. Loughran (2003) suggests the researcher needs to approach the project not being the 'expert', not holding the power or pre-existing answers to the research questions but working together to see what might be possible. Therefore my role was to be immersed in the reality of the participants and through coming to understand how through symbolic exchanges, we collectively and individually viewed each other and ultimately who we are as teachers engaging in understandings of children's learning (Nuttall, 2004).

Within a Symbolic Interactionist approach, the researcher cannot be completely neutral, therefore, it is necessary to facilitate the social constructivist nature of the research itself. Flick (2006) suggests that any data analysed and interpreted by the researcher becomes part of the findings and analysis as well, that is, it is important to acknowledge at the outset that the positioning of the researcher necessarily influences the choices of the information and data used and how it is used in reporting the findings of the study. In any qualitative research the researcher is going to have their own perspective and values and needs to be honest and upfront about these through the process (Flick, 2006). As is the same for the participants, the researcher constructs their own reality and truths from their experiences and develops meaning symbolically from the world around them. This collective construction of meaning is critical within a social-constructivist and constructivist approach. In this research, I wanted to directly relate to the participants' experiences, to construct shared understandings of our lived experiences together. As I was equally embedded in educational, political and cultural discourses as the participants, and made this position and intention clear when

working with the teachers. While we worked collaboratively in gathering data, I was responsible for the interpretation and analysis of the findings, portraying and representing the full range of realities experienced by the participants. From a social constructivist perspective and to ensure the findings of the research were as robust and valid as possible, the participants and I constructed meaning together to ensure a shared understanding of practice and pedagogy.

4.7 Summary

I was a visitor in the early childhood centre and was aware of the time, commitment and effort participants contributed to the research. There is a certain amount of pastoral care that was needed when working with teachers in a busy environment, and sensitivity to busy workloads. I wanted to make sure the research was worthy of the teacher's time and commitment; to want to make a worthy contribution for people whose opinions mattered, and people whom I had respect for, within the same educational community of learning and practice. According to Rogoff (2003) there are always risks and benefits from any type of research as challenges, difficulties and conflicts are possible. Therefore, I was mindful at all times that I had power over the ways in which the participants were portrayed through the research. Findings of the research were carefully transcribed, transparent and sensitive to the culture, context and participants of the kindergartens.

4.8 Ethics

According to Miles and Huberman (1994) all researchers involved in qualitative research should ponder the morals and ethics of their own study. Particularly, “Is my study worth doing? And how will it contribute in some significant way?” (p. 290). Deciding on the methodology, process, participation, data collection and analysis, all present ethical considerations when working with relationships. Due to the nature of interpretative research, findings and data analysis involve a

number of personal and professional values, involving a range of responses and threads of thinking. Therefore, this research, as in any qualitative research, is reliant on engaging ethically to achieve the aims of the study. All appropriate consents and security safeguards were approved in an ethics application in accordance with government regulations that outline the standards for ethical research (Australian Government, 2023). For example, I only visited the kindergartens when the children were not there, ensuring I did not observe the teachers working with the children as they were not the focus of the study. I had local knowledge of all kindergartens within the association and therefore there was a chance I may have had an existing relationship with the participants. I was a regular visiting lecturer, with the kindergartens employing many students I had taught in their initial teacher education. With knowledge of kindergartens, I was also able to know which teachers might be interested in my research, therefore considered approaching particular teams of teachers individually. It was therefore important to this study that this relationship is acknowledged, and that the role of researcher was clearly articulated. Within the cohort of the two teams who participated in the research, 67% of the participants were ex-students of the Bachelor of Teaching I taught in. The remaining participants had an existing relationship with through being experienced mentor teachers for students. Therefore, there was an existing professional relationship with each participant prior to the research project.

As the data collection took several months to complete, it was essential to discuss and set boundaries of professional behaviour between myself and the participants. I was cognisant of my role in being positioned as being either an insider or outsider to the research (Bukanais, 2002). According to Hedges (2007), ethics is present within all phases and aspects of qualitative research. Therefore, this research, as in any qualitative research, was reliant on engaging ethically to achieve

the aims of the study. Traditional post-positivist approaches and scientific methods to research, focus on proving and testing the accuracy of a particular hypothesis. Qualitative and interpretive methods such as those adopted for this study, examine a phenomenon on its own terms and recognise and explore the meaning of personal experiences (Smith, 2016). Analysis involves in-depth semi structured or unstructured interviews with people involved in real experiences. The emphasis for myself was to try to make sense of the participants, trying to make sense of their own world. This research was not concerned with establishing one truth, nor facts and technical explanations through engaging with a large number of participants. This qualitative and interpretive research focused on making meaning within a particular context; where answers are unknown, considered uncertain with the unknown as the focus.

According to Smith (2016) the challenge within this research approach is maintaining a rigorous and systematic approach however allowing exploration and creativity in its design I ethically needed to consider several factors when engaged in interpretivist and qualitative research due to the flexible and responsive nature of the methodology. For example, I needed to be aware of their participants' levels of comfort to collaborate and participate, in other words to know how far is ‘too far’ to go beyond the known notions of the participants (Scott, in Wyse et. al., 2017). Questioning, interviewing and discussing perspectives with participants can be intrusive. I needed to be aware of their own experiences and be conscious of not pushing a particular framework on the participants' views of themselves. As a researcher, I needed to be aware of unintended outcomes and actions from the participants, as with research there are always intended and unintended outcomes (Scott, in Wyse et.al. 2017). “Dealing with ethical issues effectively involves heightened awareness,

negotiation, and making trade-offs among ethical dilemmas, rather than the application of rules" (Miles & Huberman, 1994, p. 297).

4.9 The Framework Data Collection - Three Phases

Phase One - Exploring the perspectives of teachers in their current practices in teaching and learning

Phase Two - Introducing an opportunity in professional learning to revisit current theories in socio-cultural teaching and learning and, cognitive constructivist theory in schema learning theory; and

Phase Three: To explore teachers' perspectives as they make sense and meaning of schema learning theory, alongside their current practices in socio-cultural theory

4.10 Overview of the three phases of the research

Three phases for the research were created to give the study a broad trajectory in exploring the evolution of the research. In other words, the phased approach invited myself and the research community to use the methods to work through a series of progressions with participants. The starting point in Phase One was to use the methods to find out what theoretical and pedagogical strategies teachers were already using in their practice. Exploring teachers' current perspectives on children's learning and in particular children's thinking and working theories, was important to establish a foundation for further phases of the study. Through exploring what was already happening in the setting, I was then more able to understand what perspectives the teachers were using in their practice. Of particular interest in this phase was the teachers' existing perspectives of schema and socio-cultural theories in children's learning as this would determine my approach to Phase Two. While two sites were used for the research, the focus was not to compare teachers' perspectives between sites, rather gathering data across two sites to enable a wider scope for the study and to provide richer data.

Phase One explored teachers' current perspectives in thinking about children's learning. In Phase Two I instigated an opportunity for professional learning[8] for participants to explore schema learning theory and socio-cultural working theories for the purpose of identifying children's thinking (Athey, 2007). During this phase, I provided readings and provoked dialogue to assist the teachers in making sense of children's thinking from both their current approaches in exploring learning dispositions and from schematic theoretical perspectives (Athey, 2007). I had knowledge that the kindergarten's 'current approach' involved the sociocultural approach of identifying children's learning through narrative assessment or learning stories (Carr, 2001) focusing on learning dispositions. Schema learning theory (Athey, 2007) was explored through professional learning in addition to their current approach and was offered as an additional strategy to explore children's thinking.

Phase Three involved participants exploring what they had learned through the professional learning and then, observing and working with children in their kindergarten and recording their on-going perspectives. Data collection and analysis occurred through all three phases of the study as it was the on-going transformative perspectives of the teachers shaped by both sociocultural and schema learning theory was of interest to the study. This phased approach will be further discussed in the ensuing chapters.

4.11 Conclusion

Ultimately, this research investigated teachers' perspectives on identifying children's thinking as working theories, in addition, what schema learning theory might have to offer their current

[8] See appendix G

practice. This qualitative research engaged in methods which allowed unexpected and unknown outcomes. It was anticipated that through this research, participants would develop new understandings and meanings and, to add richness to their existing lived experiences as teachers. Symbolic Interactionism as a theoretical framework was the selected lens to observe and critique how participants engaged in rich dialogue as they developed meaning and shared their emerging perspectives on children's thinking.

It was not the purpose of this research to change or alter the participants' current practices in teaching and learning, however, to offer an additional way of thinking about children's thinking into their current practice. The success of this research could be measured in multiple ways. One way was through teachers' increased confidence to articulate children's thinking *as learning* through a socio-cultural or schematic theory, or through elements of both approaches. The research outcomes of exploring socio-cultural and schematic approaches to thinking strengthened teachers existing practices in identifying and responding to children's working theories. Equally important was the capacity for transformative thinking and development within the participants themselves. Further unexpected responses and outcomes have emerged from the data. This was expected and desired within the methodology of the research itself and be captured, interpreted and considered for what it might offer for future studies in the next two chapters.

Chapters Five and Six present the analysis each of the three phases of the data collection in detail. Each phase provides examples of data collected and begins the data reduction and thematic, interpretative analysis. Following this, Chapters Seven and Eight discuss the overall research

findings, including the significant contributions to the field of early childhood education, and include recommendations for policy and practice.

Chapter Five – Phases One and Two Data

5.1 Introduction

Chapter Five explores the initial processes of data collection. It begins to introduce the work with the participants from across the two early childhood settings selected for the study. As it was not the intention of the study to compare the data from the two research settings, data and findings are collectively drawn from both research sites.

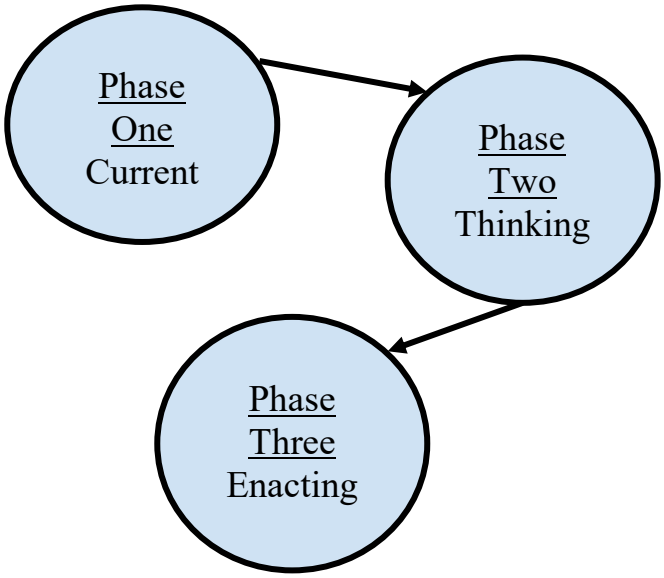
In alignment with the methods of the study, the first two phases were designed to 'set the scene' for the data collection in Phase Three. In other words, Phases One and Two were designed to develop a foundation of shared understanding of current practices in teachers work, recognising children's learning. The method of shared discussions during Phases One and Two enabled collective meaning between the participants themselves and myself prior to Phase Three of the study. Such opportunities enabled everyone involved to identify their own perspectives and be clear about the purpose and focus of the study.

As outlined in Chapter Four, each of the phases took a particular focus within the holistic project:

- Phase One: Exploring current practices in identifying and responding to children's learning and establishing a collaborative research community;
- Phase Two: New thinking about possibilities: Introducing the participants to key theoretical and research-based concepts related to schema learning theory and working theories through an opportunity presented as professional learning;
- Phase Three: Enacting new possibilities: Data collection, reduction and analysis which is presented in Chapter Six).

Figure One:

Three phases of collaborative research: **Phase One & Two**



5.2 Phase One: Current practices in identifying and responding to children's learning and establishing a collaborative research community

The first phase of the research involved spending time developing a relationship with the participants and establishing a beginning for the inquiry, namely the foundations of current practices across the research community. Phase One included two components:

(i) Re-establishing relationships;

(ii) Establishing teacher perspectives on current practices when identifying and responding to children's learning.

As stated earlier, I already knew each of the participants prior to this project, either through being a lecturer in their initial teacher education (ITE) programme or having been a mentor teacher for students through our ITE programme. Given that the early childhood community was small, having existing knowledge of the participants was not viewed as an ethical risk, rather as an opportunity to

extend collaboration. Time was spent re-connecting and exploring what was happening in our work. What was important for us all in the process was developing a 'safe space' from which we could move forward in interrogating the research questions, examining and reflecting on emerging practices related to the topic, and generating new ways of working. All interviews and discussions were held in the teachers' own environments, where they were comfortable and able to influence the set-up of where everyone sat. Interestingly the initial circular configuration of seating arrangements stayed exactly the same for all of our meetings, so much so I was able to predict and assist in setting up the space if visiting earlier than expected. This predictability of our positioning at each meeting gave each of us a sense of collegiality, respect and comfort, and equally interesting, in the predictability and direction of who might be inclined to speak or share first.

Phase One was not only about re-establishing relationships but designed to explore teachers' current practices in identifying children's learning, particularly around the idea of exploring working theories, the heart of this research. During this early phase, the teachers had already read the overview of the project and an article on schemas I had written previously (Kelly, 2016). This meant we entered our early meetings with a shared language and understanding of the foundational purposes of the research. Once we had settled into the space for discussion, I initially outlined the scope of the project and became very tuned into hearing and observing their initial responses. The first face-to-face discussion was meaningful in terms of reviewing the timeframe, the scope of their involvement in the inquiry and range of methods being suggested. In addition to attending the collaborative meetings, the teachers were asked to record their individual reflections, ideas and questions in a journal, responding to examples of research and literature provided. While the meetings enabled the community of teachers to make meaning together, the journal enabled a space

to reflect for themselves, to make sense of what they were learning and thinking in relation to their own experiences. The teachers seemed very pleased to have their own personal journal, as at this point, there was obvious nervousness and excitement at having something of their own within the project. AD stated, “oh wow, are these ours?”.

The ground rules for the research process emerged early in our discussions and included the following. The community of participants, including myself, agreed that

1. It was important that we were freely able to openly discuss the range of perspectives, approaches and influences that shaped our perspectives of children's learning.
2. It was implicit in the design of the study that it was essential to value all ideas as a starting point for the study, as trust was needed for collaborative, authentic and critical ongoing dialogue and learning together (Cresswell, 2014).
3. As the researcher, I was sensitive to ensure inclusive conversations through inviting participants to actively shape the dialogue and to be part of a learning community.
4. It was important in establishing the research community that each teacher experienced a sense of feeling valued, of being competent and capable in the project, not unknowing or simply research participants.

During Phase One I was an active listener trying to gain a sense of what the teachers were already thinking, doing and exploring. This provided a catalyst for planning the next phase, an opportunity in professional learning. Working together as a collaborative learning community was a critical aspect of the methodology and intent of the project, not only for the teachers but also myself as the

researcher as there were many times I stressed my ‘unknown’ thinking about the possibilities of the project. Being guided by the symbolic interactionist approach of the study, making meaning had to occur through sustained, genuine constructive interaction. Therefore needed to be completely open to perspectives of how they worked with their own children and show genuine interest and care in their views. To establish the constructive nature of the project, I highlighted the importance of individuals being able to develop meaning but also the process of making meaning through their interactions with each other (Cresswell, 2014). The methodology and methods of the project enabled both possibilities.

5.3 Current perspectives in teachers’ own practices

This study broadly asked the question, “What perspectives do teachers have about ‘working theories’ (children's thinking) and schema learning theories?” Due to the interpretative and responsive nature of the study, the beliefs and practices that the practitioners brought to this early phase of discussions provided the foundations for growing the conversations and future learning. All early childhood teachers in the context of this study have varied backgrounds and philosophies because of their initial teacher education and teaching experiences. For example, teachers can be trained in home-based care, kindergartens and education and care, or within philosophies of Montessori or Kaupapa Māori. Therefore, each centre has autonomy within their context to reflect their own philosophies within the cultural nature of the community in which they work. This means not all teachers and centres do everything in the same way. Therefore, the diversity of early childhood teachers in this study, brought rich data to the collegial conversations.

The process of extrapolating the teachers' existing thinking and meaning making in relation to their current practices initially presented a sense of vulnerability and ‘being exposed’. Until, as a group,

they were able to build confidence in one another and in sharing their experiences within a trusting environment. Initially while teachers were tentative to share their thinking and allow themselves to be vulnerable, due to the collaborative nature of discussions, this enabled them to become more confident and explicitly willing to share their thoughts. I tried to anticipate their possible exploration of theories, curriculum and pedagogical influences on practice; however, because of the nature of the methodology, the teachers were able to guide the conversation into their own spaces of interest. In entering this space with the teachers, whilst I as the researcher, presented guiding questions as provocations, I was very open to the ideas the participants might bring to the discussion.

The next section presents a way of bringing the teachers' thoughts, ideas and conversations into an overview of what they refer to as a framework for their current practice.

In carefully examining their perspectives, three main threads of influence in their current thinking and practice were identified as:

1. Curriculum and learning dispositions;
2. A focus on relationships for children’s learning;
3. The importance of te ao Māori and bi-cultural practice.

Following on, each one of these threads are explored. As the interviews in Phase One drew to a close, we also explored barriers and challenges that the participants faced in their current practice. These are outlined at the close of this section on Phase One.

5.4 Influence number one: Curriculum and learning dispositions

Overwhelmingly participants reiterated that in their current practice, they drew from a learning dispositional framework to underpin their thinking around children's learning. JK stated:

> "For me I have always found learning dispositions so much easier to recognise, in the instance, to see and recognise" reflective of JT further reinforcing this idea "I thinking my thinking is when I see something happening [with children] I'll be thinking 'dispositions, dispositions' but then I guess, the working theories might come in my back thought, I'm not thinking working theories right then. Working theories don't come into my thinking when I'm doing assessments or anything like that" (JK, Interview one).

The learning dispositions documented within *Te Whāriki* include 'taking an interest, being involved, persisting with difficulty, expressing a point of view and taking responsibility' (Ministry of Education, 2017, p. 23). Learning dispositions are integrated and reflected within the strands of learning within *Te Whāriki*; Belonging, Well-being, Communication, Contribution and Exploration. Dispositions are broadly considered a combination of knowledge, skills, and attitudes that children develop as they engage in the exploration of their world. Teachers talked about their practices in taking observations of children and looking for particular learning dispositions. For example:

> "When I sit and I'm observing and thinking about *Te Whāriki,* communication, exploration, possibility thinking around a learning disposition, what is that particular thread that you see for that particular child, whether they are a communicator, can express themselves through lots of different ways, through reading, books, writing and drawing" (SM, Interview one).

In this example the teacher highlights the ways in which she observes and thinks about a child's expression and communication and how she might recognise this particular disposition of 'expressing a point of view' consistent with the strand of communication. Generally, teachers reported feeling comfortable and confident in recognising learning dispositions due to the observable nature of

children participating (or not) in learning experiences. There was consensus among the teachers that they were required (by law, policy and employer) to follow the dispositional framework. Additionally, they felt all other teachers generally accepted learning dispositions as the current focus for learning within all early childhood centres. Curriculum aspirations (Ministry of Education, 2017), current literature and opportunities within professional development in their own organisation, supported teachers to focus on fostering learning dispositions in their children. As an example of the influence of curriculum, one teacher SM said:

> "I think when you get *Te Whāriki* thrown at you so much and then you've got these dispositions in front of you, so when you are thinking about children's learning, cause *Te Whāriki* tells you what they are, its giving you examples [of the dispositions]" (SM Interview one).

Identifying children's interests was considered a critical element for beginning to identify and work with children's learning dispositions. In other words, through recognising a child's interest, for example, 'bugs', teachers were able to observe and plan for learning dispositions in 'taking an interest and becoming involved' within experiences involving bugs. Examples of 'interests' further included setting up experiences for children to practice their problem solving, risk taking, persistence and independent thinking, all consistent with a particular learning disposition (Hedges, 2007, 2022). For these teachers, regarding their current practices, noticing, recognising and responding to learning dispositions are considered the most appropriate and valued approach for learning, assessment and planning.

The participants reported that the advantage of this framework for themselves as teachers was, they were able to notice the developing complexity of children's learning dispositions over time, through valued participation and engagement with others. For example:

> "We often think about that for our individual or group planning, for individualised planning for the tamariki [children], we use the notice, recognise and respond and what dispositions are playing out opposed to others. And it's a time thing, you see all of this develop over time, you see the robustness and rigor of the disposition" (PS, Interview one).

5.5 Influence number two: Relationships for children's learning

Consistently, the community of teachers reported that relationships were deemed to be critical for developing learning dispositions. 'Relationships' as a principle of the curriculum *Te Whāriki* is generally held at the heart of socio-cultural theory, pedagogy and practice (Carr, 2001). Within early childhood theory and practice relationships are essential to enable any influence or impact on the child and their learning. First and foremost, the teachers felt that they needed to work as a collaborative teaching team (regardless of differences) to create an environment for children conducive for positive relationships and learning dispositions to be nurtured. For example, teacher JK shared it was important to work together as a team to support new children starting at the kindergarten, she said:

> "With a child who is just beginning you need to look at where they are at. It goes back to our philosophy that we created; we all get along and have similar ideas and I think our beliefs and values are very similar". JK further stated: "And it's about having an open mind set, we are three very open-minded teachers and out philosophies are very similar, and it really works, any of us can bring an idea or a spontaneous review to the table and we will be like, yip let's do it"
> Researcher: "so it's creating that safe environment"
> JK: "yeah so we are all sharing in similar ideas and vision for this place"
> JT: "Reflective collective" [everyone agreeing and laughing] (Interview one).

Teachers also reported they valued the time and energy they spent together to develop shared understandings and expectations for children. For example, as teacher SM shared with the group:

> "To maximise opportunities for learning dispositions means giving our children time and space to experience a range of emotions and experiences, and to work through experiences with support from us as teachers" (SM Interview one).

It was the perspectives of the teachers at this stage of the project that teaching and modeling social and emotional strategies for learning were highly valued to uplift the identity and confidence of the child. The group reflected on how they collaborated and aligned their practice within the aspirations of *He Mapuna o tamaiti: Supporting Social and Emotional Competence in Early Learning* (Ministry of Education, 2019) those being social justice, self-management, social competencies, empathy and developing an ethic of care for others. The teachers reported that drawing from this document enabled them to support all children's learning dispositions and strengthen relationships. On reflection, it could be observed that the teachers felt that through taking the time to have real conversations with children, to explain and explore their feelings and develop meaning, that the children build trust in their relationships as they learn to work with and alongside others. JT reiterated the centrality of relationships as core to their current practices when she said:

> "I still think that coming to kindergarten is about learning to get along with others, about relationships, you can be a rocket scientist, but you still need to learn to talk to others" (JT, Interview one).

5.6 Influence number three: Curriculum - te ao Māori and bi-culturalism

Throughout the collegial conversations the teachers identified the importance of educational policy and curriculum in shaping their current practices. Referring again to the importance of policy and government guidelines, several of the teachers considered these documents essential in providing a lens for learning. The bi-cultural curriculum *Te Whāriki* (Ministry of Education, 2017) was foregrounded as the most important policy for guidance on learning, in particular, learning dispositions. One teacher expressed support for one particular government policy, the framework of

Te Whatu Pokeka (Ministry of Education, 2009). This sentiment was generally agreed to by all. *Te Whatu Pokeka* highlights exemplars of children's learning cognizant with bi-culturalism and valued concepts from the New Zealand Aotearoa indigenous culture, te ao Māori. The value of this document was explained by JK:

> "For me I really like the models from *Te Whatu Pokeka* and the models of knowing and doing and so for me, a big part of it is about relationships, getting to know children first to see how they learn, observe and once we have that connection or relationship, I can see how they are learning" (JK, Interview one).

As *Te Whāriki* is a bi-cultural curriculum, concepts from te ao Māori were consistently highlighted and valued within teachers' current approaches to learning. Examples included identifying children's engagement within 'ako' (being the teacher and learner) and 'tuakana teina' (being older, or more or ess experienced). For example, AD stated:

> "Our children are a lot younger, it's such a huge range so it's trying to navigate and support each child, that's where we reach out to the tuakana [older child], its support them [younger child] to settle in" (Interview one).

Tuakana teina was valued as providing a framework and lens calling older children to help younger and new children to show them around and to learn the routines and boundaries (kawa and tikanga) of the centre programme. PS commented:

> "For example, it's about setting the kawa [what happens in this place] of the kindergarten, the kaupapa [purpose] and the tikanga [rules and routines] and setting those expectations for tamariki, whanau and what we want them to learn" (PS, Interview one).

Teaching with and about the concepts of mānaakitanga and whānaungatanga (hospitality and creating a family style environment) were consistent with the idea of learning dispositions situated within relationships. SM stated:

> "A lot of what we do is around mānakitanga and whanaungatanga and we want to instill that with the children" (Interview one).

A child feeling a sense of well-being and belonging was identified as essential in establishing solid relationships and needed for on-going participation (Ministry of Education, 2017). Participants' perspectives on effective relationships for learning generally reflected the concept of culturally responsive approaches to children and their learning. For example, drawing on kaupapa Māori theories of (whānau, mānaki, aroha; love, care, family) to build and maintain responsive and reciprocal relationships within a bi-cultural environment.

As noted earlier in the chapter, the community also explored barriers and challenges that teachers faced in their current practices.

5.7 Barriers and challenges within current practices

Exploring the challenges teachers faced within their current practices was an unexpected but rewarding trajectory in the narrative. Predominantly, the participants involved in the study had been teaching for many years with a range of experiences to draw upon. An on-going challenge for many of the teachers was the change fatigue in educational language, including written language in policy documents and educational jargon that they felt was frustrating to keep up with. Over the years they had experienced many changes in pedagogy and theoretical perspectives from developmental to socio-cultural influences. The teachers agreed that the language of learning had evolved from what they termed as 'basic and obvious' to complex and academic.

The teachers felt it was ironic that while ‘teacher speak’ about learning was becoming more complex, the experiences and activities children were actually involved with hadn't really changed since the 1950 and 60s, rather they felt it was just that language around it that had changed. It was the perspective of several members of the research community that the following statement was reflective of how they felt:

> “Children were still playing with dough, puzzles, books and sandpit play, however the language around this type of activity for children had changed from ‘simple stages in play’ to more complex ‘learning dispositions’” (PS, Interview one).

Another participant reiterated this idea when she said.

> “So, a lot of ways in which children explore and do activities and express themselves in the world hasn’t really changed; it's just the ways in which we talk about it and understand it has changed and the language that we use…then it was ‘do they know their colours and is it soft or hard’ or things like that but now we think of it in a different way…they are exploring their senses and empowering themselves...the areas they play with are very entrenched in what we expect them to do, but we understand and view children’s learning very differently [as complex dispositions]” (SM, Interview one).

While teachers generally felt comfortable and confident working within the dispositional framework for learning, they felt opportunities to extend learning were increasingly being limited due to restrictive health and safety policies. Teachers felt that to foster deep and robust learning dispositions, they needed to be able to offer a range of experiences to extend and grow children’s abilities.

> “We want them [children] to be confident and competent learners, but we have the problem with all these new policies coming in like taking away all our risks from our playground, things have to come out as they might be a risk, everything has to be ‘fixed’ to the ground now” (PS, Interview one).

Another barrier identified by JH included teachers having to navigate 'the shifting sands' of centralised organisational policies and procedures to a 'one size fits all' approach. For example, a policy within their organisation recently dictated that all kindergartens had to streamline online processes for writing assessments about children's learning dispositions (learning stories), regardless of the effectiveness of their process already in place.

The unique framework of *Te Whāriki* has traditionally enabled teachers to develop their own way of writing about children's learning dispositions. However, with recent centralised changes being implemented all of the teachers expressed feelings of resistance collectively and noted their concerns about a loss of autonomy and identity, feeling increasingly, they were being assimilated and homogenised away from their localised and distinctive context.

5.8 Summary - Phase One

Participants were open, honest and passionate about their current practices. They felt that utilizing the framework of learning dispositions and the principles and strands of *Te Whāriki* strengthened their commitment to positive outcomes for children. The concept that the teachers would utilize a learning dispositional and relationship-based framework for learning was not unexpected as part of the research. However, the challenges they experienced alongside this revealed new insights into teachers' work. Exploring the challenges teachers experienced was very meaningful as it highlighted the passion and importance of teachers wanting to retain their own unique ways of thinking and working with children and communities. Relationships and the people they are working with were at the heart of their practice. It was disappointing to hear teachers discuss the potential loss of autonomy in their practices that they have held for so long. At no other time of the interview process had the teachers been so connected through shared ideas until they talked about

these challenges. On reflection, this may have been a reason why some of the teachers were so keen to be involved in this research project. For some of them, the project may have been an opportunity to re-establish some independence, and something that could be claimed as 'their own'.

As Phase One came to a close and Phase Two unfolded, it was timely to introduce the research community to a component of professional development that was central to the research project and question.

Through phase two, of central interest to the semi formal interviews were the following sub-questions:

a. What perspectives were teachers developing as they engage with schema learning theory and how does this impact on their ideas of children's working theories within their socio-cultural practices?
b. What is motivating this child in their behaviours and what are they thinking about?
c. Has this child shown this behaviour before? What other behaviours might connect with this one to give me an indication of their thinking patterns?

5.9 Phase Two - Thinking about new possibilities: An opportunity in professional learning[9]

Phase Two provided an opportunity for the teachers to engage with the origins and theoretical principles of schema learning theory and the constructs of socio-cultural theory. Further, teachers were able to consider this new knowledge in relation to the research questions. Schema learning theory was offered as an alternative theoretical perspective alongside their current approaches in

[9] See appendix G

socio-cultural theory for teachers to consider their perspectives in identifying ‘working theories’ in children’s learning. The same content was offered at both early childhood sites. I chose the content for the professional learning opportunity based on the collective perspectives on teachers' current practices analysed in Phase One of the study; generally, that teachers did not draw on either working theories or schema to shape their perspectives on children’s learning. An example of this thread of thinking is when AD said she didn't know anything about working theories and wanted to know more. The following provides insight into the responses from the teachers at the conclusion of their professional learning.

5.10 Participant Responses to the Professional Learning

Following the professional learning, all the participants confirmed that the term ‘schema’ was familiar to them, having heard it through their initial teacher education programmes; and for some, associating the term with theories from Jean Piaget. The wider term ‘Schema learning theory’ itself, however, was less familiar. One participant associated the professional learning session to her experiences with her own child:

> “My son when he was younger, used to collect clothes that were the same colour and line them all up, and now he is studying accounting and management and working with numbers. When I look back, it makes me wonder about the reason behind it” (PS, Interview two).

In this example, participant PS was exploring the possible connections between a schema in ‘lining’ up and any future impact on a child’s life.

While teachers articulated a strong sense of confidence and competence with learning dispositions as a framework for learning (Phase one), this was not the case with ‘working theories’. While some

participants felt they had a reasonable sense of what working theories were, others were not at all confident in what this meant or looked like. For teachers who felt like they had some sense of working theories, the following example highlights the general thinking when participant SM stated:

> "I think working theories is quite broad about what it might be, and is about the context of what the learning is and what is happening" (PS) "It's their understanding of something of what they are processing and doing at that point, what happens, i.e. when having babies and how they see what happens instead of what actually happens, some know the truth" (SM, Interview two).

An example of participant JH beginning to explore a possible working theory through working with a child who showed interest in wheels (rotation, Athey, 2007):

> "And then there was S who was inside because he wasn't listening outside, and I couldn't have him crying all day so then I thought well he likes trains so I got some out and got him painting and he did take over, we talked about the wheels and he likes the wheels, especially the circular motions so then he was passing that thinking on through his painting. I was trying to think of another way to extend his thinking in his love of wheels… but I was not sure what that was..." (JH, Interview two).

While through this phase teachers were unsure about what a working theory was and additionally, what to do with a working theory. In other words, why was it useful for them as teachers to recongise a child's working theory and recognise the value in exploring or extending a working theory.

> "It's something that I have had in the back of my mind, sometimes I look at children and think I wonder what might be going on there? But I don't know what to do with it…What's the next step?" (SM, Interview two).

While the concept of working theories was familiar, generally teachers felt they didn't use this knowledge in their current practices to shape their ideas about children's learning. This idea is demonstrated in the following example:

> "I think my thinking with the working theories is that's what's behind the disposition, so I'll see something happening and I'll be thinking 'dispositions, dispositions' but then, I guess the working theories will come after in my back thought, I'm not thinking working theories right then, I can see them working together blah blah blah, working theories don't come into my thinking when I'm doing assessments or anything like that" (JT, Interview two).

Through the discussion it appeared that while the participants knew that working theories 'should be' part of the learning identified, this did not necessarily come to them readily when analysing learning or doing assessments. All participants expressed the desire to find out more about working theories and how this might have an influence on their practice.

> "For me, I have always found learning dispositions so much easier to recognise, in the instance, to see and recognise…When I read your reading [on schema, Kelly, 2016] prior to doing this there was this wee girl who pops into my head, she would collect rocks. So, for me, there is so many questions going through my head, so why, is this a coping mechanism, is it at calming thing, sometimes she does it heaps and then she doesn't' and I noticed towards the end of the term she was starting again" (JK, Interview two).

Following the professional learning in Phase Two, teachers agreed that after some discussion about schema particularly as framed by Athey (2007), they felt 'schema' could quickly be observed in their own children. An example was provided by SM when she stated:

> "schema can be observed when they are lining items up, sorting items and categorising" (SM Interview two).

The teachers continued to discuss their thoughts about schema post professional learning and identified that they felt patterns in behaviours (schema) were more noticeable in some of their children than in others and wondered why this might be. One teacher raised the question of why a child might be demonstrating a particular schema but then suddenly stop (JH). These were some exciting questions teachers were raising post professional learning which provided an effective momentum for continuing the research project at that stage. It was apparent that the participants recognised the concept of 'schema' as something different than a 'working theory' but raised many questions that could be explored. The following are examples of questions raised by the participants during Phase Two:

- "Is schema the same as a working theory?" (JH)
- "Is the schema something different or the same?" (JH)
- "Is labeling a child with a schema a useful thing to do? Can we think about schema without the label?" (SM)
- "What are children getting out of the schema?" (PS)
- "If you recognise a schema, can that help you to identify a working theory?" (JT)

These questions suggested that the participants were beginning to make sense of what a schema might look like, however they were making sense of this in relation to what a possible working theory might be. The questions came about through collective discussion and therefore became the starting point for our next phase of the project and further discussion.

5.11 Conclusion

The intent of this part of the study was to gain qualitative insights into how teachers who are working with children are exploring particular ideas and frameworks to shape their current practices in learning. The participants' frameworks for learning; relationships, dispositions and bi-cultural

curriculum reflected a strong socio-cultural theory and perspective, where the kaiako (teacher) is embedded in mana enhancing pedagogy and discourse. As this study took a symbolic interactionist approach, it was essential to create a safe space for further discussions to come as the teachers presented their own values, insights and questions in the process of making meaning of their work in the professional learning stage. This was important as schema learning theory is not traditionally thought of as a 'socio-cultural theory' rather it's deemed a 'developmental' theory. However, Piaget (1950) wrote about schema as a 'constructivist theory' opening us to new possibilities and ideas that might enrich existing practice. As a group, participants and I discussed the importance of creating this space, where all participants were able to share their doubts, hesitations, share their experiences, realities and construct meaning as they interacted together. The learning community needed to engage in meaningful dialogue with each other to see what might be possible as the project developed.

Chapter Six reports on Phase Three of the study and in doing so, identifies participants' responses and perspectives to schema learning theory as they went on to engage in observation and work with their own children after their professional learning. During this phase they were completing journal entries in response to their work with children, and in response to readings and team discussions. Chapter Six further identifies the key themes and outcomes that became evident as the teachers engaged with schema. Further, the chapter identifies specific findings from the research data itself and articulate key implications that reflect the aims of the study. Chapter Seven engages firstly with teacher reflections on themselves as learners and practitioners, and secondly, the effectiveness of the methodology used in the study. Chapter Eight then critically analyses the findings of the study and makes recommendations for further research, policy and practice recommendations.

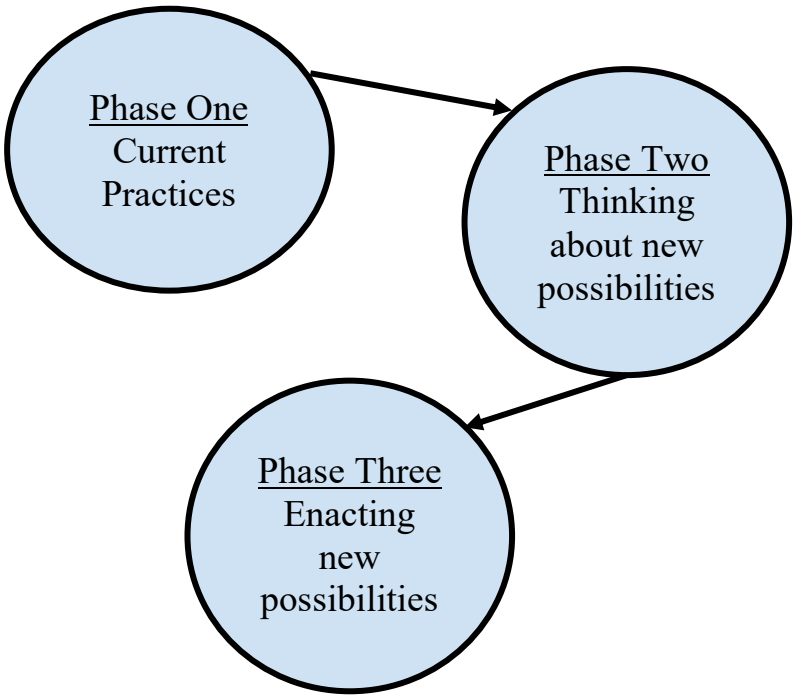
Chapter Six: Phase Three: Enacting new possibilities: Data collection and analysis

Phase Three of collaborative research

Figure Two:

Three phases of collaborative research

Phase Three



6.1 Introduction

This chapter reports on Phase Three of the study. As outlined in Chapter Five, Phase One portrayed the complexities of participants'current thinking, particularly through their professional practices of identifying children's learning. Phase Two offered the teachers an opportunity in professional learning, focusing on schema learning theory and working theories and opportunities to offer additional possibilities and thinking when identifying children's learning.

At the conclusion of Phase Two, the participants were asked to select children from their own early childhood settings who might be involved in regular and systematic schematic behaviours and learning. As outlined in Chapter Five, during the professional learning all participants had access to a range of readings including Athey's (2007) work on schemas including detailed behaviours that might suggest a schema in action as well as an article I wrote in 2016 which also focused on teacher's working with schema learning.

Once children were chosen by the participants and consent granted by parents, the participants were asked to observe the children over time, documenting observations and their own thinking about what might be happening. The teachers as participants were asked to use the frames of reference provided at the professional learning to guide their thinking, that is, Athey's 'labels' identifying particular behaviours as schema and literature supporting 'working theories' (Hedges, 2007, Hargraves, 2013, Ministry of Education, 2017). The teachers were asked to document their on-going perspectives in their journals, plus any reflections and responses to any new learning they experienced. This enabled sustained observation and thinking, which further enhanced professional learning and in-depth observation of children's learning.

Phase Three presents the qualitative findings of the research through interpretive data analysis (Creswell & Creswell, 2022). Following the methods in Chapter Four (transcription of data and analysis), key themes based on teacher's perspectives were identified and ultimately informed the overall findings for the study. The themes identified are representative of teachers' perspectives on their experiences working with children and their responses to a schematic way of working in their practice. Of importance to the themes identified, is the teachers' perspectives on schema and how,

through this way of working as professionals, they can enhance their engagement with children's working theories. Therefore, an interpretative analysis of the participants' insights and perspectives on schema learning theory and working theories is problematised alongside the themes identified. As the data from this phase was simultaneously analysed with the ongoing collection of data, four significant themes were identified and elaborated upon in the text that follows.

6.2 The four themes from the data:

The four propositional themes elicited from the data include the following:

1. Schema learning theory draws greater teacher attention to children's thinking and identifying working theories;
2. Teachers have a significant role in extending schematic thinking as children engage in their learning;
3. Engaging with schema deepened relationships with children; and
4. Children move through 'stages of cognitive thinking' as they explore their schemas and working theories.

6.3 Theme number one: Schema learning theory draws greater teacher attention to children's thinking and identifying working theories.

Based on the perspectives of the teachers participating in the study, they reported that through exploring schema learning theory in their own practice they, as teachers, have shifted their attention to focus more deeply on what children might be thinking. Teachers noted that through learning to identify a particular 'schema' that a child might be involved in, they developed a more refined awareness that a child's action or behaviour might indicate something meaningful, for example,

noticing a schematic way of ‘thinking’, drawing attention to a concept or idea the child might be trying to figure out or explore. For example, SM shared her experience with S (child):

> “Yeah with like S; it [schema] has definitely helped to be able to have way more concrete things about him to share, what he might be thinking about or trying to work out, and we can say to parents ‘hey try this” (SM, Interview 3).

Through their increasing awareness of children's schemas, the teachers commented that they were able to reposition their own cognitive processing as professional educators to become more aware of children as ‘thinkers’; repositioning themselves to be more able to ponder what children’s thinking might be about. This was new to the teachers’ current practices. As SM commented:

> “I’d say his schema is ‘lining up and trajectory’...today he (S) was pulling out all the cars and trucks [as he does], lining them up. I said ‘have you got them all out? Maybe just one more?’ basically until he has pulled them all out. I’m trying to figure out why...” (PS). “He was lining them all up, they [the other children] were helping him sort and line them up and he was building relationships with them as they were doing it, and was happy to put them back at the end which was good” (SM, Interview 3).

While the teachers did not always know specifically what the ‘thinking’ was, they commented that they were more able to recognise and analyse moments that the children were ‘thinking’. Based on the conversations as a group and with myself, it became evident that working with schema and individual children increased teacher awareness of how children might think about their own world. As SM stated:

> “So a particular schema is just a way of processing and making sense of the world, like it becomes a ‘doing thing’, not a “done thing” ... it's good to think about where their thinking is coming from or how they think” (SM, Interview 3).

This evidence demonstrates that through teachers reporting that they are shifting towards taking a 'thinking' view of children, they revealed that this invited them as professionals to do so not only in focused observation, but also to recognise the significance of a child's behaviour as 'thinking'. Many teachers gradually shifted the ways they observed and reflected on children's learning. This was a significant finding of the study and is clearly reflected in the conversation of two participants below:

> SM… "we used to think about dispositional learning and that was everything we thought about, what were the dispositions but now we think, why can't we include this [schemas]?... and then PS extended this comment by saying: "yeah… and how does that relate to their [children's] learning outcomes, yeah, and why can't our response [to the learning] include that?" (Interview 3).

Through following their own children with particular schemas, teachers began to ask, 'why was a child doing what they were doing', something they had not asked themselves prior to the research. The conversation of the participants below portrays this sentiment which was also similarly reported by many of the teachers as the project unfolded:

> "Yes its [schema] has been interesting as I know that we are all now looking at some kids so differently which has been cool" (JH). "I have to say I've really enjoyed it; I've loved it [looking at schema] because it is making me think differently (SM). "Especially S, he fascinates me because you know how he can come over as someone who's a bit bolshy [bossy], there is quite a bit behind him, we now think 'are you really thinking? What are you working out?' he's quite fascinating" (JH Interview 3).

Often the teachers would notice similar schematic actions and behaviours occurring with different children/groups of children, however, each teacher reported different ways of interpreting these ways of thinking. Through discussion of their individual perspectives regarding the differences, their collective understanding of the phenomenon was enhanced and captured in the words of one participant:

> She stated: “We have all noticed things that are similar but also differences about the same children” (PS). Further, JH discusses the positive outcomes of working together with schema, “I felt we have all given a little bit on each of them [the children] to provide a bigger picture of them because we have worked with them different ways, gives us a better overview of them when we are talking about them” (JH Interview 3).

There was agreement across the community of the new collective learnings that resulted from the on-going discussions. For example:

> “Its [schema] definitely provoked a lot of conversation between us and made us think in different ways, like one of us will say something and we go “OH…” and see it in a different way than what we used to” (SM Interview 3).

Developing a shared perspective through speculation of what schema the child might be exploring and thinking about was motivating for the teachers. It was enlightening and resulted in new ways of processing information and consequently, the ways in which they worked.

And yet, there were ongoing challenges. One interesting insight into the complexity of the ‘thinking child’ was when a participant (JH) shared her own thinking and puzzlement about the idea that a child who seemed to have a similar schema to another child, did not always respond the same way to experiences created for that schema. She was challenged by the idea that a child may explore a schema for different reasons than another child resulting, for her, a deeper understanding of children’s working theories:

> “I think it's about getting your head around what it is they are trying to achieve, through their schema because the thing that fascinates me is that looking at all the different schema, do they all come to the same conclusion or do they look at it differently and then when everyone puts their input together, they get something out of it?” (JH Interview 3).

To this comment, I responded:

> "Or is the schema just a way of or a tool for something else, is a way of them working to help make them make sense of something?"

This question acted as a provocation to stimulate further reflection and prompted JH to state:

> "Yeah, it's like their working theory" (JH Interview 3).

As the research project unfolded, there was evidence that as teachers enhance their professional understanding of the thinking child, they gain deeper insights into working theories.

In the following example, the teachers are trying to make sense of the ways in which schema works with and or alongside their thinking about working theories. Within the dialogue there are clearly differences in perspective, however, each is trying to make sense of their own. This example, while lengthy, demonstrates the power of this professional learning where teachers are bouncing ideas off each other and extending their thinking, increasing their professional expertise. The dialogue begins with PS, when she commented:

> "Yeah, I have found it [the study] quite useful too, I've found it good, but I think for a schema to work, you have to have that 'working theory' beside it. There has to be a combination of both, I don't know if it's one or the other" (PS Interview 3).

In response JH commented:

> "Yeah, for me a schema is just a way of working out a working theory, it's just another way of going about it, it's just one more way of working it out" (JH Interview 3).

The discussion continued with two other teachers sharing their experience of making sense of working theories and what might happen next. SM expressed concern in her comment:

> "I still don't know what I understand about working theories, I think I can identify a schema, this is where this person is at and then I'm having more confidence to think about what might happen next" (SM Interview 3).

She was affirmed by PS who reiterated her own growing confidence:

> "Cause you sort of knew a little bit more about schema [to SM] when you [researcher] came along, I had no idea what it was about, so it's been good to look at that child and then think of a particular schema" (PS Interview 3).

SM also expressed similar feelings of professional growth that she had experienced when she reported in response to the earlier statements:

> [prior to this study] ... "thinking about dispositional learning .... was everything we thought about, what were the dispositions but now we think, why can't we include this, and then how does that relate to their learning outcomes, yeah and why can't our 'respond' include that?"(SM Interview 3).

As the affirming conversation continued, a number of participants shared examples of their growing expertise on how their practices have been adapted in response to this new way of working. A sample of these are listed below:

> "Yes, we have adapted our individual assessments a little to include that, perhaps what schema they had" (PS).
> "Yeah, it's changed the way in which we talk about dispositions, and we would have never had conversations like that before" (SM).
> "And sometimes for a schema and or a working theory [whatever way you put it] they have to have that disposition to be able to have the confidence to do it or otherwise they may bottle it up or something that none of them can be isolated they all tend to work in together" (JH Interview 3).

In the extended discussion outlined above, the teachers' perspectives capture the value in giving each other the confidence and permission to continue to think about and use schema in their on-going practices in teaching and when writing assessments. These living examples of teachers co-constructing their thinking collectively is significant as teachers use their own working theories and experiences to make sense of what they are exploring with children. Their engagement reflects the socio-cultural and symbolic interactionist framework of the study that celebrates the significance of meaning making in this specific context of early years education.

Based on these teachers' perspectives, the analysis of the data provided in reporting this theme recognises that schema has created an additional lens for them to think about early learning, in addition to their current practice in focusing on learning dispositions and outcomes from the curriculum. In particular, teachers collectively affirm that children need dispositions to engage in their schema explorations.

6.4 Summary - Theme one

As the participants explored schema learning theory, the evidence reveals that the teachers repositioned their thinking to give greater attention to children's working theories and their thinking. The learning community began to raise significant questions about their own involvement and ability to contribute to the schema and or working theories. The transformative nature of these teachers' engagement with schema and working theories as outlined above, reflects the earlier empirical literature that argues:

> "The enrichment of schema learning calls for a high level of teacher involvement. To optimize learning, educators need to spot the schemas, identify the level of schema functioning [functional, symbolic or abstract thought] and expand schema related experiences so children learn in deep and thorough ways" (Cubey & Mitchell, in Meade, 2005, p. 52).

The quote above captures exactly how the teachers in this study immersed themselves in reconstituting their own thinking about working with children. It is now evident that schema learning theory draws greater teacher attention to children's thinking and identifying working theories. In doing so teachers realise that they have a significant role in leading children's learning in new ways, the focus of Theme two below.

6.5 Theme number two: Teachers have a significant role in extending schematic thinking as children engage in their learning

From the outset of the project the participants were interested to discover what their role as teachers would be when working with schema alongside their current practices. Initially the teachers shared examples of uncertainty and a lack of confidence in their expertise. These are some of the questions that shaped the narrative of their early concerns about their own role:

> "... what if I'm stuck on my idea of what the schema might be, will that influence or under influence what I am offering?" (PS)
> "... And then how do we know if we have got it right?" (SM)
> "… Yeah, but I don't know if it is right, is it?" (PS)
> "... How do we know from their response that it is?" (PS Interview 3)

The following question reflects and captures the initial uneasiness that most of the teachers expressed at the outset of the study:

> "It's like we all have our own ideas on what we are doing but then, are we doing enough, are we doing it right?" (PS Interview 3)

In response to such uncertainty, the learning community turned to the empirical literature for guidance. The literature scaffolded the teachers and I in dialogue and in endeavours to find answers to these questions (Meade & Cubey, 2008, van Wijk, 2008, Athey, 2007). In every study that we read, it was suggested that the role of the teacher was not only to observe and plan for particular schematic exploration, but to immerse themselves within the 'schema itself'. According to the literature, teachers had a role in extending thinking through questioning, providing resources and using language directly related to the actions in the schema.

Through reading the research from Meade and Cubey (1995, 2008) and van Wijk (2008) in particular, teachers individually and the community of participants in general, were reassured that they had a pivotal role in not only identifying particular schematic patterns in thinking, but in fact extending cognitive processing through language and engagement. Their commitment to this concept of redefining their roles as teachers is best captured in the words of one teacher:

> "It's really interesting to read how 'Wilton' (Playcentre, van Wijk, et al., 2006) are looking at ways to take schema more deeply e.g., mark making; language, social relationships, co-construction, fantasy play, etc. I have observed now I am feeling more confident in where to go in terms of language, resources, and being more open-minded…" (JH, Interview 4)

Exploring a redefined role within schema was a significant finding in this project as not all studies have found teachers to be so readily interested in 'teaching' within a cognitive/schematic developmental lens. Anne Meade (2006) reflected in her writing on the reluctance of teachers to get involved in interactions with children to extend their cognitive learning and development:

In 2006, Anne Meade stated:

> "Observation suggests that teachers are reluctant to accept an interactive role in relation to children's cognitive development, to scaffold their learning about thinking. Research about thinking children shows that even when teachers volunteered to join an action-research project which aimed to facilitate children's cognitive development, they were more likely to facilitate children's working theories by adding in different material and equipment, than to help children by *talking* to them" (p. 39).

The data presented and analysed within this chapter demonstrates that the teachers in this study expressed perspectives contrary to this finding of Meade's (2006). As will be shown in the next section of this theme, the teachers' activity moved towards reconceptualising their work in building their expertise when developing working theories as the basis of children's learning in their contexts.

6.6 Teacher engagement

The literature (Meade and Cubey, 1995, 2008 and van Wijk, 2008) emphasised the importance of teachers' intentionality in using schema specific language and resources when engaging with children within their schema. For example, if the teacher identified a schema in rotation, the interaction around the action of rotation could involve language such as 'going round, faster, slower, frontwards, backwards' etc. (Athey, 2007). Additionally, teachers provided a range of resources that enabled the child to explore rotation, for example, wheels and cogs. Data presented further within this theme provides evidence of teachers' engagement and growth in their intentionality within children's working theories, bringing a greater sense of confidence and expertise to their perspectives along the way.

Athey (2007) argued that when the teacher intentionally uses the language associated with the schema, this adds complexity to the child's thinking and engagement. Congruent with the literature and following examples of data, the participants reflected on the ways in which they used language

more intentionally compared to their usual practices to support the child once they knew about their particular schema. The following are examples of how teachers explained their use of language when facing a child's 'mess' and concurrently, demonstrated teachers' sense of intentionality that grew with confidence.

> "E is a transporter, she had a whole lot of puzzles and she had them in a container, so instead of me usually saying 'take that stuff back to where it goes' I said 'can you carry the puzzles over here, let's see what things you have here that go on this puzzle' so we did that puzzle, and then I said 'I wonder what might go in the kitchen' [directional language] so instead of thinking of the mess and it going everywhere, it sort of turned it into a learning game so sometimes I think it's how we react…?" (JH Interview 4)

Another example of working with the child who takes everything out of the shed to sort and categorise, building intentionality using directional language:

> "The interesting thing was once I sat down with him [instead of telling him he can't do it] and said 'now that you have pulled everything out of the shed, how about before you go home today, we can make sure we put it all away?' and he kind of thought about it and then later I went back to him and said 'remember how we talked about that' shall we do it together, he took the lead and it was systematic the way he put it back and it just wasn't sorting the stuff that he pulled out, it was everything in the shed, he started with the biggest and then he got to the smallest" (SM Interview 4).

To extend on the teachers thinking about the use of intentional language, the following interaction took place as an attempt to build teachers' reflection on practice, and in doing so, recognising their growing expertise in their field. I asked:

> "So, are you saying to him 'where will we put this bit, or where is this going to go' or something like that? SM responded:
> "Hmmm… I started with 'which one are you going to take in first? and he started with the biggest truck, and he said, 'put the big trucks at the bottom' so once he filled up the biggest, to medium to smallest, he filled it up and I was thinking, in my own quirkiness, 'that's how I would do the shed'. I was fine with that"

> So, I said “So his thinking is biggest things on the bottom, medium sized in the middle and smallest things on the top?”
> PS then suggested “Is it a visual or systematic thing?”
> After some thought, SM responded “or is it that's how he took it out…he takes the bottom shelf out first then the middle shelf and then the top shelf” (Interview 4).

As the interaction continued, one participant (SM) theorised the way in which she could directly approach this particular child to ‘making sense’ of his schematic interest in sorting, categorising and ordering the sandpit toys:

> “We have worked out ‘the thinking’ in our teacher head, we have an expectation… but they [children] haven't worked that out, we have to give them time to process, and if that's leaving the sandpit shed open so he can get everything out, every single day, so be it” (SM, Interview 4).

This example highlights the ways in which collectively, the learning community co-constructed examples of intentional language in an effort to explore and enhance a child’s possible line of thinking. Such examples highlight a significant shift in thinking from the participants. The examples here reflect on how a teacher (SM) would have responded prior to the research project “instead of telling him he can’t do it”, approaching the interaction with intentionality, more deeply aware of a possible schematic way of thinking.

In further examples, the teachers became so aware of the importance of using intentional language, they noticed when there was an absence of schematic based language among groups of children. In the data there were examples of teachers demonstrating intentionally when entering the activity with children to use language related to the activity they were exploring. For example,

> "I noticed that when a group of children were exploring cars going up and down the ramps which were lines, rotation and trajectory, they were not using a lot of language between them… So, I began to narrate what they were doing saying 'your car is going up the ramp and then down the ramp'. I noticed the children then started using saying 'up' and 'down' as they raced their cars" (PS, Interview 4).

The teachers generally found that the children became more verbal and responded quickly to the genre of language that the teacher was modeling in the engagement. This example was affirming in that it became evident to the teachers that the use of explicit language did have the ability to extend and develop children's engagement in their schematic explorations. As Athey (2007) and other studies (Meade and Cubey, 1995, 2008 and van Wijk, 2008) have already suggested, the teachers in this study observed that the purposeful use of mathematical or scientific language linked to a schema, extended children's engagement and participation in what they were doing and learning.

Another example of teachers' redefining their use of instructional language to extend children's thinking and engagement related to mathematical concepts is provided in the following example. JH began a conversation through reflection on her work from an earlier occasion. She began:

> "I think he is quite fascinated by machines, yesterday he was helping me when I had the lux [vacuum cleaner] out and he would find little things that he could put on the floor for the lux to suck up, he has got a thing about machines but I'm not sure what other schemas he has" (JH Interview 4).

In response another colleague suggested that this was an example of spatial and trajectory thinking based on her interaction with the same child on a different occasion in the sandpit. She spoke to the child and said:

> "Have you got them all out? [sandpit toys] ... maybe just one more? but I ended up saying "just one more, just one more" until basically he has pulled them all out and now, he is also happy to put them back which is good" (PS, Interview 4).

Following on JH explicitly verbalised her perspective about why explicit language was so important to these events:

> "So, when he gets the blocks out I say to him 'Can you find the blocks that are the same size' and then he will find all the blocks that look the same size, so as you said, bringing in some of that extra language that he might know is feeding his schema to him as well" (JH, Interview 4).

As time unfolded, participant JH continued to express how she was redefining her spoken language to children as she grew more confident in her understanding of schematic thinking. She noted that she was enhancing her language, but additionally offering a range of resources specifically intended to extend the child's schema (working theory). For example, she reported to the group:

> "It's been interesting to see how some of the kids have been using some of the things we have provided. Like with A, I put out all my bits and bobs [small parts] to add to a possible sorting and containing schema, and he was turning them around and doing things with them, lining them up and stacking them, right up to the edge, and I wondered, is it some sort of spacial moves he was exploring? Ordering and lining up?" (JH Interview 4).

This example highlighted the way in which this teacher, like many of the others, intentionally planned for a particular schema however was very open to the ways in which the child responded, adding complexity to her own thinking about what the child might be thinking about.

In summary, the following statement provides evidence of one teacher's thinking (SM), that through her engagement with schema learning theory, she was encouraged to respond to children's learning

inclusive of the knowledge she had of a schema. Here she is applying what she has learned about schema to her current practice of 'notice, recognise and respond' to the learning. SM stated:

> "I think [schema] is making us think about our responses, like when we are thinking about our noticing, recognizing and responding, we look at the recognize, we think, is it valid for us to say we recognize this schema?" (SM Interview 4).

6.7 Summary - Theme Two

Unlike the teachers in Meade's 2006 study, these teachers embraced the concept of intentionality to enhance children's thinking and working theories. Consistent with their current practices, teachers' perspectives reflected that they have a significant role in extending schematic thinking as the children engage in their learning.

They did so through:

(i) Becoming more confident in noticing possible threads of schematic thinking and being able to respond more readily.

(ii) Collaboratively and explicitly engaging as a community of participants in an effort to re-define their own practice in noticing, recognising and responding to schema learning theory

(iii) Recognising the need for and implementation of descriptive and instructional language to support and extend children's schemas and working theories.

6.8 Theme number three: Engaging with schema deepened relationships with children

According to the perspectives of the participants, engaging with schema learning theory in an effort to make sense of their children's working theories, had a significant impact on the positive nature of their relationships with children. Overwhelmingly, teachers shared with the learning community

examples of strengthened relationships with children after sustained engagement and focusing on both noticing and responding to children's schema, highlighting positive outcomes for both the children and themselves as teachers.

In the professional learning phase of the study, the participants reviewed Athey's (2007) research exploring the positive outcomes for children when teachers engaged with schematic learning. Athey (2007) suggested that schema identification was possible when children demonstrated behaviours that were considered 'annoying'. In other words, these were repetitive behaviours that were judged unusual, or inappropriate in terms of the teacher's expectations. The significance of the idea that 'annoying behaviours' would be useful for schema identification, arose very early in the project. In response to hearing about this research, one participant in particular (SM) suggested she was able to immediately think of some children she worked with that aligned with the idea of 'annoying behaviours'. The following example highlights this thinking:

> "That was quite a fundamental moment for me, [be]cause last time you visited [researcher] you used the word annoying, and I was pleased you used the word annoying because some of those behaviours are really annoying!" (SM Interview 3).

This participant then described how she first noticed a particular child's annoying behaviour and began to think about it:

> "... I sat every day outside for a week and let him S take all the stuff out of the sandpit shed [annoying behaviour]. It was a struggle for him because he thought the door was going to be shut. Every time I went towards him you could see him thinking "oh my god, the door is going to shut, I've got to get everything out" (SM Interview 3).

As she begins to reflect about this child's behaviour in terms of schema, SM reshaped her mindset to think differently about her approach to his actions. The participant's perspective develops into

what the child might be 'thinking about' as he takes all the toys out of the shed. In the following she reflects on her changing perspectives to his behaviour:

> "I thought to begin with [laughing] 'oh my god he's doing it again, I'm shutting the shed" .... you could watch him, and he would get the stuff out as quickly as he could before someone saw him ... and I'm like oh no…"

And then on further reflection:

> "...it's a bit sad if he's feeling that way, so I sat on the edge of the sandpit and we talked about the vehicles, lining them up, taking them in and out, big and small…we just kind of talked and I listened more...I think he is involved in more things in the programme now, he's engaging more with the other children, he has a different relationship with them now doesn't he" (SM Interview 4).

In the description above participant SM provides evidence that she experienced a moment of clarity in her thinking. SM took her time to notice and discuss the child's repetitive behaviours in lining toys up, categorising and sorting and to listen to the child and what he had to say. Through the example there is evidence that she was more able to understand the child's intentions when she focused on schema, rather than behaviour.

After this participant's experience recognising and responding to a child's schema, she expressed to the learning community that she felt through engaging with the child's schema, she strengthened her relationship with a child who was deemed somewhat 'challenging'. The participant described the changing trajectory of the child's learning journey into a more positive one after she responded to his schematic thinking. In other words, through schema learning theory, this teacher described how she was able to deconstruct and reconstruct an image of the child from being an 'annoying' learner to being an 'engaged' learner. Over time and with further opportunities for the child to freely empty the sandpit shed, SM noticed a positive difference in their relationship:

> "It's really changed our relationship...After spending time observing and interacting, our relationship has developed into a warm positive fun-loving relationship. He is more responsive, listening to instruction, verbalising more, developing an understanding around the tikanga and kawa [routines and practices] of our kindy, understanding expectations of tidying up and what this means for him and us...He is openly affectionate with very loving enthusiastic hugs, he will verbalise, "I love you" (SH Interview 4).

To get a sense of how SM felt about such a change in her relationship with the child, as the researcher I asked her to reflect on and share her perspective of her own thinking about the process with this child. Identifying a pre-project perspective, she stated:

> "I think looking right back to our first session, when we questioned, does the label of schemas help us to identify and help with that [to work with the schema], or are we putting children in boxes? And I still think about that, and I think, is this just putting them in the box or, is this helping us understand them better? And for me, knowing more about the wording around the type of schemas has helped me understand them better" (SM, Interview 4).

SM continued:

> "I think, [the research] has given us a deeper sense of the relationship that might be possible with us? When you think about S, like when we identified that this is his schema's before, I was so annoyed, I was like 'Oh my god, why can you just not...' 'Why can't you just put those toys away?" (SM Interview 4).

And then a change in her perspective of the child and his behaviours emerged once she had identified and responded to the child's schemas in lining up, sorting and classifying:

> "....like it was almost a specific moment with me and S, like I had to stop and listen and then he realised that I was there to support him, and the relationship just changed… he is so much more settled, especially with other routines, he stops and listens, he's affectionate" (SM Interview 4).

SM further reflected on her change of perspective in herself as a teacher after her engagement with this child and his schema reporting:

> "And then I thought, it's not about him [the child] but it's about me, I have to ask myself, what do I need to do to make that ok, I had to do a retake and think. It's interesting, I'm quite fascinated, I've just got a different appreciation for who some of our children are" (SM Interview 4).

The example above triggered ongoing professional and personal reflection for other participants as they continued to examine and reflect on the lense's they were using to identify children's working theories. JH also noticed a significant shift in a child-teacher relationship after noticing and recognising their schematic thinking:

> "We have seen such benefits for A [from schema], like the other day he came in and sat down he put his arms around me and snuggled down and said 'I love you" ... (JH). PS then noted the significance of this event…. "There is no way he would have said that prior to this project, he wouldn't have even come near us" (PS). The implications of teachers' shifting perspectives on children's behaviour is noteworthy (Interview 4).

Identifying children's 'annoying behaviours' was a useful strategy in the beginning of the project, for teachers making the shift to recognise schematic learning. One participant was able to describe her perspective of the effectiveness of turning a negative behaviour into a positive one. Here she explains:

> "Schemas make 'undesirable, challenging behaviours' [to be] seen in a totally different light. I guess I looked at this anyway in reflection of my teaching but hadn't viewed it as schema. It's not what you 'see' happening but understanding the enormous aspect of 'why' something is happening" (JH Interview 4).

This development in teacher recognition that schema underpins the way children engaged in learning, grew from strength to strength as the project evolved over time. However, as time unfolded, the teachers were able to increasingly notice schematic learning in behaviours not just considered as annoying, proving their developing expertise and confidence to use the theory to

identify children's working theories. One participant identified that her earlier perspectives of learning (prior to this project) could have created barriers to children's learning in the early childhood programme. A sense of this is captured when JH stated:

> "...and also for me, it's making me think as a teacher that I might be the one causing the problem because of the way I might have reacted… because I haven't actually sat back and thought, well actually, what is happening there?" (JH Interview 4).

As the participants continued to explore schema learning theory and working theories in their explorations with children, their perspectives and understandings seemed to deepen and become more complex. For example, several of the teachers shared that while providing activities for a child's schematic thinking, it appeared to them that other like -minded children were drawn towards the same experience, creating opportunities for children to develop relationships with other children. Drawing from what she had learned from the Wilton Playcentre research on their findings that children with the same or similar schemas are drawn together, JH shared that she observed more connections among children when they shared a schema:

> "... I've been looking at some of their schema stuff [Wilton Playcentre] ... they were looking at the ones with similar schemas get together, I reckon he and K [two of her children], are connected [be]cause I reckon he is into the same sort of things, often he plays around him but hasn't been noticed, he is certainly playing more with kids now" (JH Interview 4).

Through further shared examples of teachers' observations of child S, where he was joining in with children exploring similar schemas, the teachers noticed a significant difference in the child's ability to initiate involvement with other children. Explained here by SM:

> "Whether or not it's the repetitiveness of it [the action schema] it engages other people…… like we have had a lot of solitary schema, like S was solitary to start with, but now there is a group of them and they are doing similar things…they are included, they initiate into other groups so that's been different" (SM Interview 4).

SM summarises her perspective that through shared engagement in schema exploration, children are now able to experience new relationships and connections:

> "That's been a big thing for me, that is from noticing the solitariness of some of the children that we have identified …they are not solitary anymore. If they want to be there, they are still choosing that, but they have developed more skills to initiate and be included" (SM Interview 4).

6.9 Summary - Theme Three

Overwhelmingly, the participants noticed that through noticing and beginning to respond to children's schemas and working theories, they developed a more positive relationship with those children. The idea that they could turn an 'annoying behaviour' into something positive and empowering for the child, has been one of the most significant findings of the project. Across the collection and analysis of this data set, teachers found this stage of the study quite emotional. As they reported their perspectives, they noted a sense of lost opportunities or their responses to children's behaviours they now considered less than ideal. There were occasions in the data where teachers revisited their responses to children's behaviour in a negative way, they felt, through frustration in not understanding why the child might be doing something they found annoying. In hindsight, teachers reflected on these moments, struggling to realise how they might have missed what had now become obvious as they observed the inquiring child with new eyes and understanding.

The perspectives of the participants captured a massive shift in their thinking about the importance of positive relationships. Teachers also developed the perspective that children were able to build more positive relationships with other children through shared schematic interests.

In summary, teachers felt relationships with children were strengthened as a result of being more in tune with the child and in particular, their thinking. Teachers were self-reflective on their own perspectives in relation to previous teaching approaches and acknowledged the shift in their thinking and their professional practices with children. This concept will be explored further in the chapter that follows.

6.10 Theme number four - Children move through 'stages of cognitive thinking' as they explore their schemas and working theories

At the conclusion of the professional learning opportunity, the teachers began their observations of the children that they had selected. The teachers collectively decided who they were going to focus on. PS described how this process happened in her team:

> "I think we talked about children who came to mind really quickly and we made a list…and how we chose them, we all really felt it… [schema] was very quickly in our face and that's the reason that we picked them" (PS Interview 3).

After a period of time for observation, reading and reflection, teachers were encouraged to share their initial responses during our interview. It was not long into this discussion before one of the teachers noticed it was the younger children in their group who they were all choosing to observe:

> "I wonder… if you look at the children that we are looking at, that we think have schemas, they are not our oldest children, they are coming in the door and they are reasonably new, aren't they, that's interesting" (SM Interview 3).

Collectively the group realised they had all chosen younger or newer children to the kindergarten to observe. This was an exciting yet confusing revelation for the collective community to ponder. JH shared her perspective while trying to make sense of the theory she had read, as well as the inherent practices related to the theory:

> "Because when they [children] come in and they initially do it [the schema] they are physically doing it and its more in your face, [be]cause from some of the readings, it says as they get older, they can actually verbalise their schema, it will come up in conversation" (JH Interview 3).

Here JH is describing her rationale for noticing schematic patterns in the concrete materials and action stage of the framework. She is noticing these behaviours more readily in children who had recently begun to attend the kindergarten. SM further describes her experience with recognising schema in children who had just started kindergarten:

> 'I was thinking when the children first start they don't settle and it takes time for them to settle into what we do, who they are and how they fit, and some of them you think, 'oh they are wee firecrackers' and 'chaos on a stick' but actually, they are not… it might be a particular schema and that is changing my view of how I can be involved" (SM Interview 4).

Once the community of learners had established that they had generally chosen younger or newer children to observe, they became more aware of the older or more experienced children. Children who had been attending the kindergarten for a longer period were not initially considered for observation because they had not been displaying obvious schemas (concrete materials and action). Therefore, some of the participants felt they needed to explore what schema meant for the older or more experienced kindergarten children. Recognising that maybe the older, more experienced children were able to verbalise their schematic thinking and use it in more abstract ways encouraged them to re-observe their older children, looking for more abstract use of a schema.

> "It [schema] was very quickly in our face and that's the reason that we picked them [target children], however now we would pick other children who might appear more 'under the radar' and see what schema's they might be involved with" (PS Interview 3).

This was a very exciting insight and connection to the theory. The following was a question the participants came back to on several occasions to think and ponder. SM shared her question:

> "I was thinking about this the other day that the children who have been here longer, why are we not thinking 'that's a schema and that's a schema?' (SM Interview 3).

At an abstract level, a child who is exploring a schema in rotation for example, might be able to discuss how wheels enable the car to move without using materials, or apply what they have learned about rotation to a much more complex concept. For example, the rotation of the moon around the earth. Using a schema in an abstract way suggests a child cognitively, may be able to make sense of rotation in their mind without the need for concrete materials or symbols of representation. This idea is strengthened by Meade (1997) in her writing on Athey (1990, 2007):

> "Chris Athey's research (1990) demonstrated that as children explore schemas to do with curves, for example, they start with circular scribbles, then get fascinated with cores and radials, and later, progress to helixes, plane spirals, concentric circles and multiple loops. Such exploration and learning has laid the cognitive foundation for understanding, inter alia, the ways our solar system works" (p. 39).

In the example above Athey (1990, in Meade, 1997) demonstrates a progression within the early exploration of curves to more advanced concepts such as spirals and loops. Athey (1990) also suggests in this example that through on-going schematic exploration, children are able to develop complexity in their schema, enabling them apply their understanding to more complex working theories, for example, how the solar system works.

Further on-going teacher observations of older children identified children who were testing the boundaries of their schema in symbolic ways (symbolic representation) or discussing the way the

schema worked in an abstract way. JH shared an example of how she was thinking this progression through:

> "... if you think of F, before he went to school he was always building buildings with the tiles, and then you could ask him something and he could talk about it and talk you through it, he could tell you about it, so maybe his schema was in there, in his head and he was using it to explain himself and his thinking to us" (JH Interview 4).

In this example, JH is describing a progression in schematic cognitive thinking she has reflected on. She describes F as initially building buildings with materials, then moving into a stage of being able to describe and explain his understanding of how things work. After discussing this example, the community of teachers considered that this might be an indication of progression within the schema. For example, a child moving from a concrete materials/action level of thinking to a more symbolic and abstract level of thinking in their schema. Further examples were shared which highlighted particular children were no longer exploring the schema with concrete materials but through discussing and talking about the schema in abstract ways.

For example, here PS attempts to explain her thinking between the concrete materials stage and the symbolic and more abstract phase of thinking:

> "Yeah, that's the gap that I'm interested in, is it the 'thinking [abstract] child or the doing [concrete] child?' and that's what's causing me a little brain fog [be]cause I look at them and think, what is it about this little person thinking?"
> "...And it could be the other way around "What is the thinking [abstract] child doing and what is the doing [concrete] child thinking?" (PS Interview 4).

Participants JH and SM then co-constructed their thinking together, making sense of children working through the concrete material/actions and abstract stages of the schema:

> "So, if they get to practice what they are doing, do they then start to discuss what they are doing?" (JH).
> "What would be interesting to investigate would be whether through their thought processes about schemas, whether their default setting is about that and then when they sort of stop and then formulate that 'abstractness' and things change in their wee world whether they go back to working back in that concrete/action level?" (SM Interview 4).

Both teachers were surprised and fascinated to observe and think about the progressions in schema, and what this might mean for children and their working theories in this way. Statements that highlighted further perspectives and on-going meaning making are demonstrated in these progressions:

> "Is it the 'thinking child or the doing child?... so, a particular schema is just a way of processing and making sense of the world like it becomes a 'doing thing' not a 'done thing' (SM, KL). And… "What is the thinking child doing and what is the doing child thinking?" (PS Interview 4).

6.11 Summary - Theme Four

As the researcher in this project, I observed that the teacher's interest in Meade & Cubey's 2008 'stages' of schematic thinking was an exciting and rewarding theme to come out of the project. Rewarding because as the researcher, I noticed over the project, how critical these stages were to the teachers overall understanding of schemas and working theories. From their initial introduction to the stages of cognitive thinking in the professional learning session, the teachers increasingly made sense of their observations of children in cognisance with the 'stages' of schematic thinking, contributing to how they understood children's working theories. The sustained professional learning was beneficial in enabling teachers to visit and re-visit; to see and reflect deeply on their work with children. The co-joint nature of the community of learners was able to be simultaneously beneficial for children and the participating educators.

6.12 Conclusion

This chapter has reported on Phase Three of the study. Phase Three data presented the qualitative findings of the research through interpretive data analysis and the identification of four key themes that ultimately inform the overall findings in the study. Again, the four themes were:

1. Schema learning theory draws greater teacher attention to children's thinking and identifying working theories;
2. Teachers have a significant role in extending schematic thinking as children engage in their learning;
3. Engaging with schema deepened relationships with children; and
4. Children move through 'stages of cognitive thinking' as they explore their schemas and working theories.

The themes identified are representative of the teachers' perspectives on their experiences working with children and their responses to a schematic way of working in their professional practices. Of importance to the themes identified, is the teachers' perspectives on schema and how through this way of working as professionals, they can enhance their engagement with children's working theories. The next chapter will present an analysis of teacher engagement and transformation of thinking and practices throughout the evolution of the study. A discussion of the findings built on this set of theoretical propositions or themes is the focus of Chapter Eight. Throughout the discussion in the final chapter, it is argued that the substantive theoretical principles discussed in Chapter Six, make a significant contribution to the field of teacher professional learning in early

learning in Aotearoa New Zealand, and internationally more generally. In the closing section of the thesis, a set of recommendations for policy, teaching practice and further research are presented.

Chapter Seven - Relationships and developing meaning - Responses to the methodology

7.1 Introduction

This chapter illustrates the importance of robust qualitative approaches when exploring teacher engagement and practice. It does so by exploring the teachers' responses to the research methodology, reflective of their professional transformation throughout this research project. In addition, this chapter illustrates the importance of robust qualitative approaches when exploring teacher engagement and practice and explores the significance of researcher positioning in the research, guided by the methodology of Symbolic Interactionism (Blumer, 1969). Exploring outcomes from the methodology and design of the study was worthy of analysis due to significant findings regarding teacher participation, growth, metacognition and transformation throughout the study. This chapter argues that the research methodology was not only appropriate in addressing the research questions but also instrumental in building a research community that was empowering for all. The research community facilitated the deepening of knowledge and insights regarding professional practices in early childhood in the Aotearoa New Zealand context and ensured the generation of significant new theoretical propositions that will enhance the education of young children in the future.

To support this claim, examples of data, analysis and discussion are included to highlight teachers' heightened awareness of self and others as learners through the methodology of symbolic interactionism which was key to this project. As the teachers reflected on the importance of the content of the research project, namely the foregrounding of schema to explore their understanding of working theories, they were just as cognisant of their own growth,

thinking and learning. In other words, the teachers' ability to collaborate, learn and deepen their own understanding about children and themselves, was integral to this research.

7.2 Symbolic Interactionism - Why was this theoretical framing effective in this study?

This qualitative interpretive study was underpinned by the principles of Symbolic Interactionism as the theoretical foundation for the research design. The research methods therefore were shaped by or drew on tools that allow for qualitative interpretation. The Symbolic Interactionist approach (Blumer, 1969) used in this study ensured the focus was on participants making meaning of schema and working theories and how this influenced children's thinking constructed through social interaction within the teaching teams. Each teacher brought their personal experiences, understandings and realities to the study (Nuttall, 2004). Central to Symbolic Interactionism, making meaning is created through shared symbolic internalisation of content, context and language, enabling new understandings (Meade, 1934). In this study, teachers had the opportunity to construct alternative or additional strategies when thinking about their practices, a process of central interest to the Symbolic Interactionist (Blumer, 1969).

Engaging with Symbolic Interactionism in this research ensured a focus on how teachers think about and make sense of their world through symbolic, social exchanges which are subject to constant change. Symbolic exchange involves a process of active construction of knowledge through social interaction and developing meaning. Teachers developed understandings about themselves and others through symbolic interactions, language, gestures and written materials. According to Nuttall (2017), individuals rely on interactions which bring value to the image we perceive ourselves to be in the eyes of others. Through language and changes in behaviour, we are able to moderate our interactions accordingly and to perform tasks which reinforce a desirable

relationship, therefore we are actively reinforcing to ourselves the ways in which we are viewed by others. Views of self and others are therefore constructed through Symbolic Interactionism. Such an approach was critical to this particular study as the participants' ideologies, actions and behaviours were essential when thinking about interpreting and understanding a range of approaches to children's learning and thinking. This had implications for the collection and analysis of research data and the generation of the substantive theoretical findings. Within this approach, data coding and analysis occurred throughout the study to enable new understandings to emerge.

As a result of their social engagement with known 'symbols' in their current practices for children's learning (collective frameworks for learning), through Phases One, Two and Three, participants increasingly developed their understandings of themselves and others through interaction, language and shared symbols of their context (Nuttall, 2004). Symbolic Interactionism as the framework, encouraged research that enabled meaning making through exploring the thinking of the participants, 'symbolic' of their individual and shared experiences (Blumer, 1969).

The intention of the research methods was to be responsive to the direction of the participants' interest, to draw out and explore particular lines of inquiry. As a result, each phase of the methods was shaped by the researcher in response to the participants' questions and directions of discussion. Symbolic Interactionism ensured that through the semi structured interviews, collaborative discussion, experiences and understandings were shared, ultimately guiding each participant to take meaning from the research experience. Each participant's thinking was shaped both at an individual and social level (Nuttall, 2004). This was evident when the data highlighted a range of responses from others:

> "When we kaiako [teachers] talk about what we notice and potentially respond to, we engage in quite deep discussion and challenge each other's thinking and point of view, so we create a different understanding before we begin, e.g., talking about children doing and then being able to talk about what they do" (PS, Interview 4).

As the teachers deepened their understanding of 'working theories', this enabled them to create their own working theories of children's thinking. Mead's (1934) social processes, explored in Chapter Three, enabled the teacher's thinking to develop within the social constructivist and interpretivist methods in the research, the self-becoming a product of the social processes through interaction with others.

7.3 Teacher participation

The research invited opportunities for individual thinking and analysis (via documenting observations and reflection through journaling) and collaborative discussion informally as a team and in more formal interviews with the researcher. Creating a range of strategies to capture their perspectives proved beneficial as some preferred to process their thinking individually while others relished in the discussion. As a result, the diversity of thinking was unexpected, each wanting to either investigate particular ideas themselves, or wanting to get feedback and ideas from the larger group. The group discussions were at times provoking as well as affirmative in creating as many questions for each other as much as answers. Teachers co-constructed their understandings together through presenting their own findings from their target children and then extending each other's ideas from their own perspectives. This is an extension of earlier notions of Symbolic Interaction, but a significant development that strengthened the participants and the researcher's sense of community as they collaboratively constructed and reconstituted their existing knowledge and professional practices.

In general, participants actively engaged in given tasks and showed enthusiasm in discussing and listening to each other in a safe space. However, there were recognisable differences in levels of engagement, particularly in the task of individually responding to the readings. For example, some teachers wrote significant reflections, questions, and annotated notes to make sense of the readings, while others, a minority, chose not to complete any written reflections at all. Participants in small group discussions also proved equally diverse, ranging from in-depth, meaningful critical reflection on self, others and practice with very little input from the researcher to limited responses to questions and scaffolding from the researcher. When unsure or confronting an alternative perspective to their own, teachers' responses were mixed. Generally, interactions focused on being respectful and responsive, however, occasionally there were barriers for voices to be heard. For example, on several occasions one participant would talk over another and use a louder voice until heard. Receptiveness and ability to listen to each other's perspectives was variable.

Relationships are highly complex and sensitive to differences in each other that might not easily be identified amongst themselves (Nuttall, 2004). Factors that might be of influence could include the era in which a teaching qualification was completed, willingness of members to be open to current approaches to learning and the length of teaching experience deemed ‘enough’ to enable a voice in a shared discussion. Teams were in groups of three which might have reflected a stronger alliance with two out of the three members resulting in an imbalance of power and influence. However, generally, the strengths of the collaborative discussion were highlighted through the collective need for a strong philosophy, being of open mind and teaching collectively. While differences in perspectives were generally accepted, a view of working collectively in building

and establishing relationships with others was overwhelmingly accepted by all. In this example, teachers highlighted the benefits of working together:

> "We have been really intentionally putting stuff in play regarding this research which has probably helped the children come together...And we are thinking more and being more aware, so that's another finding for us" (SM & PS, Interview 4).

Making meaning and teachers constructing their own thinking proved to be a significant outcome for teachers and reflects the findings of earlier research:

> "Meaning construction for the critical constructivists is something that we do as individuals but always it is inseparable from our culture and the power relations embedded in our culture" (Prawat, 1996, in Anning, Cullen & Fleer, 2009, p.46).

Prawat (in Anning, Cullen and Fleer, 2009) captures the symbolic and interactionist process involved in the research. Making meaning of the research and enriching current teaching and learning practices in socio-culturalism was imperative to ensure this study had something to offer to the qualitative education field. The work of Blumer (1969) within the importance of social processes in symbolic interactionism as analysed in Chapter Three, involved participants not only making sense of the connections between their current teaching practices with the content of the research, but also with their own lives. For example, through previous experiences in noticing children exploring actions such as sorting, enclosure, lining items up, exploring symmetry etc., they were able to align this thinking to themselves. The teachers reported they were able to relate to their particular tendencies or repetitive patterns experienced in their own lives, i.e. organising and sorting items at home such as shoes or handbags. Through identifying threads of thinking they themselves had as adults, the teachers created the possibility they might have worked with similar ideas as far back as being children. Therefore, a perspective from the study suggested that teachers actively

explored the idea that schematic behaviours developed in childhood, this in turn could have lead to particular ways of thinking and doing as an adult. As a consequence of this discourse of thinking, the teachers reported that they then speculated about the children they had been observing, specifically, what traits or careers the children might have as adults.

Reading and re-reading through the transcribed interviews and discussions, it became apparent that each participant had been making sense and meaning through the research methodology and participant engagement in different ways. While working theories and the role of schema theory were equally discussed, each person tended to align with a particular methodological standpoint within their own trajectory of ideas or perspectives. For example, when there was a conversation about a target child's possible line of thinking, one participant tried to explain that behaviour from a purely dispositional/socialisation or interest-based perspective. However, others chose to try and understand each of the schema and actions and to see how they seemed to be more aligned with a possible 'thought' the child might have. For example, pondering if a child was exploring the schema of envelopment, might the child be thinking to themselves, 'Why can I fit materials into this container but not another?' Is all this stuff going to fit in'? 'Is this container big enough for all of this stuff'? This example illustrates some participants exploring the idea that a child's action or behaviour, can suggest what the child might be thinking about.

Through the initial discussion and Phase One of the study, there was some obvious nervousness about focusing on 'working theories'. A small proportion of participants reflected on their struggle with the concept connecting back to their learning experience in their initial teacher education or undergraduate teaching qualification. These teachers reported that they did not feel comfortable

with their understanding of children's working theories and this uncertainty created a barrier for more open discussion with other participants about why working theories are valued equally with learning dispositions within the curriculum (Ministry of Education, 2017). One participant reported that she had been challenged at the beginning of the project to engage with working theories as she had struggled to understand what it meant prior to the research. Her quote from the data below illustrates that through the collective nature of the research methods, she was able to more fully understand working theories and this was a significant outcome for her:

> "I think it's seeing it [working theories] more in practice now, I think it's easier to understand it now since we have been looking at it [in the research] and thinking about this every day, than it was before" (AD, Interview 4).

7.4 Making meaning from target children

Due to the qualitative and interpretative nature of the study, the teachers were asked to select, observe, narrate, discuss and analyse the learning of children in their kindergarten. In Phase Two of the study (as described in Chapter Five) teachers were introduced to schema learning theory through professional learning, alongside revisiting the theory of their current practices in socio-cultural learning. During the professional learning, the teachers were able to quickly align what they were learning about schema with existing knowledge of children in their kindergarten. The teachers reported that they 'fed off' each other's ideas about possible schematic behaviours they had observed in their children. Being able to quickly align schema with particular behaviours in children is not unique to this study. Several studies (Cubey, 2007, Meade & Cubey, 2008, van Wijik, 2008, Whalley, 2001) have found adults (teachers and parents) very quickly, being able to align schema with their own children or students. As the researcher I noticed that when the teachers were able to make this alignment with their their own children in their kindergarten and schemas, this

observation not only heightened their motivation but enhanced their interest to develop their professional expertise further in this area of education.

Collaboratively discussing their target children enabled the teachers to speculate, negotiate and share what they had noticed about the learning of the targeted children. As a result, overwhelmingly, participants reported that they felt like they were looking at their children's learning through an alternative lens, that they were seeing anew! Through the discussions and readings, the participants developed pathways in their own thinking and learning so that their newly reconstituted lens influenced their observation and ensured pedagogical practices leading to professional transformations. For example, as the teachers were beginning to identify children whose learning behaviours aligned with ideas of schema, participants were developing a perspective of trying to 'get it right', probing to be assured they were interpreting their own thinking effectively and whether they were making useful decisions in how to provide further learning pathways for their identified children.

Noticing children through a lens of 'schema' enabled the teachers to view children in new ways. In this example from the data, two teachers who worked together in the same kindergarten, demonstrate how they made meaning from their observations of the same children's behaviours:

> "PS: So, would you girls [teachers] agree that the children we picked to do schemas are very repetitive in their actions? if we think about their daily routines?
> SM: yes, they are very systematic about how they do things, they come in and they do the same thing" (Interview 3).

During Phase Three of the research, as the teachers shared what they noticed about children's behaviours, there were a range of interpretations and perspectives identified from both schema and socio-cultural theories. For example, one teacher was trying to analyse repetitive behaviour with the newly acquired schematic labels from Athey (2007). While in the same conversation, others were drawing on a dispositional perspective. This made sense as the teachers were accommodating and trying to assimilate new thinking into their existing thinking and practice. In such instances, teachers were able to draw on both cognitive constructivist and socio-cultural approaches when interpreting and making meaning of their observations with each other. What was critical to this process was the ability of the teachers to reflect individually and collectively to make sense of what each teacher was observing and how they collectively made sense of their ideas and found meaning within this. Some of the data suggested that once their experiences in the project were completed, there was still much to learn, especially in continuing to explore how schema enhanced their thinking of working theories. This project was only the beginning of what they might be able to explore in the future. However, it is significant to note that the research methodology was a catalyst in initiating the successful professional transformation in teacher's practices due to the deepening sense of understanding and meaning making around the phenomena of schema and working theories in the context of early childhood education in Aotearoa New Zealand.

7.5 Increasing ownership of the research

The positioning of the researcher in designing and delivering this research project and doctoral study was to create collective inquiry, to facilitate an environment rich in the social processes of Symbolic Interactionism. The semi-structured interviews and ensuing discussions were critical in creating an environment where teachers could make meaning of the reading and make sense of the perspectives of fellow research participants. It was obvious that between the researcher visits, there

was considerable discussion among the participating teachers themselves; however, through sharing their collaborative thinking and questioning in interviews with the researcher, new insights and perspectives were being developed through the process. Of note when analysing the data from the discussions, the researcher took a facilitative and observational role in the process. For the most part, the teachers dominated discussions and felt comfortable to openly express moments of confusion as well as those moments of enlightenment when they made sense of a new idea or an alternative perspective from other participants. My contribution was manifested through making comments such as: “Can you tell me more?’ ‘Going back to what you said earlier...” “How did you go through that process?” “so what you are saying is...? “Maybe you were thinking...?” This type of questioning encouraged the participants to explain their perspectives in more detail and when revising an idea, to explain themselves in an alternative way with examples. This was effective in giving everyone time and a range of lenses to accommodate each other's perspectives on a particular thought being discussed.

Very rarely did I offer up more than a suggestion to facilitate further discussion. This only happened when the discussion seemed to exhaust itself or got completely off topic. Waiting for a discussion to completely exhaust itself did not happen often but strategic intervention was offered as required to get the discussion back on track. The following is an example of the teachers increasingly taking ownership of the research. In Phase Three of the research gathering, the researcher asked:

> “How does your work here make you think about the children you teach?’

And the teachers responded:

> "Thinking about children differently in terms of slowing down a little bit more and watching, surveying and thinking about what learning might be involved, for sure" (AD).
> "I think for me too, in terms of writing learning stories now, I'm using more working theories language than I was learning dispositional language. I think it's because its [working theories] have been more in my head at the moment and it's at the forefront?" (JT).
> "I think we may 'see it' now? (JK) (Interview 4).

Through these types of interactions, the researcher realised that the teachers were increasingly becoming capable and confident to direct their own learning, to ask and answer their own questions, particularly, when thinking about what they were going to do with their new learning about schema. Ultimately, participants took ownership of the research. An awareness of becoming more 'knowing' became obvious over time as the teachers became increasingly intentional about what they were putting out and planning for children to explore linked to an identified schema, no longer needing guidance and suggestions from the researcher. From the readings (Meade & Cubey, 2008; Whalley, 2004; Nutbrown, 2006; van Wijik, 2008) teachers were encouraged to provide children further opportunities to explore (or 'feed') the schema or line of thinking the child might have had "...adults can enhance the possibilities for, and from, children's active exploration of schemas or 'threads of thinking' (Nutbrown, 2006, in Meade & Cubey, 2008, p. 25). As discussions progressed, teachers in this study developed their own perspectives about what schema and working theories meant to them and their own teaching. For example, some teachers reported that they were increasingly able to view schema as a way of representing a child's 'thinking' which would suggest to them a 'working theory' in relation to the materials, activities or actions the child was involved in. Participant JH as discussed in Chapter Six, demonstrated her understanding of being able to recognise a schema and then want to 'feed' the schema to enable the child to explore their 'working theory'. Teacher JH stated:

> "I've found having that stuff from Anne Meade [in her book *Thinking Children*] from reading that thinking about a possible schema it also gives you ideas about how you can branch out and extend the schema. [Be]cause even though the schemas might look the same, you will use the materials and resources in different ways. Sometimes they look like they are following a very similar formula or pattern but not always. But I don't always look at a child and think 'that child is doing circulation' but more about how they are utilizing the materials and how that translates for them" (JH, Interview 4).

When kaiako (teachers) talked about what they had noticed and potentially responded to in children's thinking, the learning community engaged in deep discussion and challenged each other's thinking and point of view to create alternative understandings. During these interactions teachers were talking about what children were doing, how they made sense of their observations and then metacognitively reflecting on their own responses, and how and why they responded to the children's behaviours as they did (SM, in her documented analysis journaling). PS highlights this process by stating:

> "This research made me question my own way of doing. Do I have a way of doing/being or is it because of my interest my doing/being??" (PS, Journal).

7.6 Effectiveness of the methodology in this research

Towards the end of the data collection, I intentionally shared my thoughts on the significant contribution teachers had made to the overall project. I had underestimated the teacher's commitment, enthusiasm and collective investment that was given to the project. This revelation was not due to any known limitations of the teachers, rather it was in response to the teacher's perceived heavy and demanding workloads. Their enthusiasm to 'learn' and to potentially bring something new to their thinking and practice was humbling. However, their positive and engaging

participation ensured I needed to rise to an equal level of engagement to ensure they utilised their time as much as possible. As a result of the above, I wanted to make such revelations explicit to the teachers. From Phase Three, the following are examples of myself expressing my initial thoughts about teacher's engagement and how the teacher's responded:

> Researcher: "One thing that I have noticed [and you might not all agree] is that you people make a lot of sense of what you are doing when you talk about it together"

SM and PS seemed surprised when I shared this with them:

> "What, the three of us? (SM) "Go girls! That's nice to know" (PS)

I continued the feedback:

> "You each make suggestions that extend each of you, and you're thinking about what you are doing and what you might do… you are fleshing it out based on what you all know about the children and arguably, you might do that anyway without being involved in discussing schema?"

JH and SM then went on the explain the difference that learning about schema meant for them:

> "...but it's [schema] given a whole new insight into how we think …. [be]cause you want all the kids to be achieving, so it gives us another insight into how we can help them to achieve, without it being seen in a negative way so instead of saying 'S' is naughty because he is doing such and such, we think why is he doing such and such, it's not always going to be attention seeking…" (JH).
> "And when we are planning, we are thinking about that in a different way, it's not what is the 'thread of that disposition' it's about schema as well" (SH).

Bringing the conversation back to the teacher's learning:

> Researcher: "It sounds to me that you are doing an awesome job with those [schema] kids, I wish I could be here to watch…"
> "I think our relationship has changed with some of them [children], hasn't it [to the group ...]" (SH).
> "Like today when S wanted to go outside and he couldn't, he was crying his eyes out. He was just sobbing, so I said to him, "I'm so sorry that you can't go outside S do you

> need a hug?" and he did. Months ago [before recognising his schema and working theories] he would have never done that" (PS).

Through the methodology in this project, teachers were increasingly able to notice children's working theories, and generate rich knowledge through their collective learning about schema. The following represents one participant's summary of being involved in the project:

> "Doing this research has brought to light the importance of thinking about working theories and not only dispositions. Once I took the time to think about it and changed my views slightly, it opened up more of an understanding around how some children think, and how important their prior thinking and experiences are. I understood how important they were previously, but this has brought the importance even more to the forefront of my thinking" (JT, Interview 4).

Reflecting from her thinking prior to the study, this participant further stated:

> "Now when children say or do something, I find myself observing more and wondering what they are trying to say or do? Why are they doing that? Where did they gain that knowledge about that? How can I support that? Is it a one-off thing or have I noticed something similar before. So many questions…." (JT, interview 4).

In this example the participant is reflecting on the ways in which she is not only thinking more about a child's thinking, but she is thinking about her own thinking. The following is a range of examples of participant's experiences of the research project.

> "Working theories are a great platform to refine with this lens [schema]. I can notice a child in the midst of their working theory and take notice, extend on with repetitive processes. It [the project] has really helped me to pull more out of my learners." (JL, Interview 4).

> "It's [the research] added depth to the teaching and learning environment. We both agree (AD, JK) with how this has deepened our teaching practice in action and in articulation/documentation. With our new lens of observation and wondering why, we

> are provoking them in differing ways as we can pick up now on the schema that they repetitively apply and understand how we can extend on these across the whole environment (AD, JK, Interview 4).

> "It's the way that they are learning, how they explore, investigate and try to figure something out. I reflect on their learning now in a different lens. I ask, 'Why are they doing that?' 'What's the purpose?' I look at their mahi [work] with a deeper thought now." (AD, Interview 4).

General discussion amongst the group highlighted the idea that participating teachers were keen to continue to learn more about schema and to possibly write and publish their own stories and journey while learning about it. During Phase Three the teachers felt that their new learning in schema was going to become a pedagogical approach they were going to take into their future decision making about children and their learning:

> "I was just going to say, I feel like this [schema] is going to become part of who we are and is part of what we do, this will sort of layer in there as well" (SM)
> "So it might be that when we write our individual learning stories, we might have a section that we could articulate what schema might be going on" (PS)
> "Or it could be that you include little threads of their thinking?" (Researcher)

When discussing whether teacher's thought the introduction of schema into their practice was successful and had value, the teachers responded positively including the following:

> "And I still think and keep questioning, has it [schema] made a difference, and then when we stop and reflect on it we can see, yeah it has actually, it really has".
> Researcher: Is that a question you would have asked yourself before?
> "No" [everyone laughing] (PS Interview 4).

> "I think before we would have tried to stop them doing what they were doing whereas now, we look at it and think how can we promote what they are doing so they can explore how to do it, instead of causing a mess, they are causing thinking..."

> "When other children [not our schematic children] are doing something and we tell them not to, and then they say, 'they are doing that and that' and we say 'no that's ok'

> [laughing]. So the other children who we haven't been observing for schema, they are like developing this strong sense of social justice [laughing] (SM & JH,Interview 4).

7.7 Conclusion

The research created as many questions about children's thinking and learning for the teachers as it did answers. Teachers seemed genuinely pleased they had been involved in the project and were keen to continue what they had learned going forward into their practice. In conclusion, they shared a range of questions that they were interested and motivated to explore in the future. The following questions could be useful in relation to future research and investigation. Also, the questions reflected the significance of the teachers' learning, thinking and transformation through the project.

Questions from teachers at the end of the research project included the following and may form the basis of future research across a broader context:

* How might children use their schema to adapt to new environments or changes in their lives?
* Can the schema lead to connection with other schema?
* Are there other undiscovered schema? Can we create our own?
* How can teachers be more intentional once the schema is no longer being explored through concrete materials and obvious repetitive behaviours? i.e. in symbolic and abstract levels of thinking.
* How do we make sense of the 'power' in decision making in what happens next (in the schema development); is it the child who leads or is it teacher lead, or both?

This chapter has presented a critique of the teacher's responses to the research methodology, reflective of their professional transformation throughout this research project. In addition, this chapter has highlighted the significance of researcher positioning in this doctoral study, guided by the methodology of Symbolic Interactionism (Blumer, 1969). In the next chapter, a summative discussion of the research findings is presented, along with a suite of recommendations for professional practice, policy and further research.

Chapter Eight - The concluding discussion

8.1 Introduction

This concluding chapter summarises and theorises overall findings from the study. Chapters One and Two introduced the study and the context of the study. The purpose was articulated and argued in relation to the empirical foundation of literature that underpined the cognate area of the research, early childhood education. Chapters Three and Four articulated the theoretical research design and methodological framework for the research methods adapted for the collection and analysis of the data. Chapters Five and Six presented the three phases of research implementation: Phase One, Phase Two and Phase Three of teacher participants engaging with schema learning theory in their current practices. Chapter Seven presented a discussion on significant findings of the study using an analytic and reflective genre of presentation. Chapter Eight begins by addressing the key research questions, critically analysing and summarising the major findings presented in Chapter Six and Seven and then demonstrated how this thesis makes a significant contribution to the field of early childhood education. The thesis has been presented over eight chapters to arrive at this point. It is recalled that the data analysis generated four key propositional themes. Based on these propositions, two key substantive findings of the study are presented forthwith.

Concurrently, two significant key substantive findings are addressed, namely:

1. Teachers have reported unique individual and collective perspectives on schema learning theory and in so doing, have enhanced both their understanding and practices in identifying and responding to children's working theories;

2. Through the framework of inquiry, teachers have reported that they have been provided with opportunities for collegial engagement and the active process of dialogical and collaborative meaning making, which has resulted in deep professional transformation in their own thinking and practice regarding schema learning theory.

And, finally, to bring this thesis to a conclusion, this chapter offers insights to the field of early childhood education in Aotearoa New Zealand through a series of recommendations for practice and policy.

8.2 Setting the scene

"What is the thinking child doing and,
what is the doing child thinking?"
(PS, Interview 4)

The name of the thesis was taken from one of the participants' comments during the data collection. The quote captures the complex ways in which the early childhood teachers in this study grappled with making meaning of the interchange between children's actions and their thinking. In this important extract from the data, it reveals a teacher's working theory in trying to make sense of whether the child's thinking motivated their action, or their action motivated the child's thinking. The significance of this insight is substantial for not only the research questions themselves but equally for the researcher and the community of teachers collectively. This quote represents an example of the complexity of thinking that participants engaged in and acts as a conscript to the transformation of the teacher's thinking throughout the project.

8.3 Revisiting the key research questions

It is recalled that the purpose of this study was to investigate early childhood teachers' perspectives on children's working theories having explored the additional approach of 'schema learning theory' (Athey, 1990, 2007). The over aching research question was:

What are teachers' perspectives on schema learning to identify children's working theories within their current practices?

Teachers' perspectives were the focus of the research questions, explored through the theoretical framing and data collection. Through a process of data reduction, thematic analysis and interpretive methods, the findings in relation to the proposed questions highlighted the transformative perspectives of the participants over the duration of the study. Each phase of the data collection presented in Chapter Five and Six, was designed to capture teachers' evolving perspectives as they explored alternative ways of thinking and theorising in their practices.

In addressing the research questions, the four themes presented in Chapter Six were discussed and conclusions drawn from the findings based on the data presented earlier. The following summation reflects the teachers' overall perspectives regarding the concept, theory and practice of identifying children's working theories in relationship to thinking and learning in the Early Childhood context.

1. Schema learning theory draws greater teacher attention to children's thinking and identifying working theories
2. Teachers have a significant role in extending schematic thinking as children engage in their learning
3. Engaging with schema deepened teachers' relationships with their children

4. Children move through ‘stages of cognitive thinking’ as they explore their schemas and working theories

8.4 Revisiting the themes to conclude

In further analysis of the four themes, each are reflective of the ways in which teachers developed their perspective of schema learning theory in relation to identifying and responding to children’s thinking. The themes reflect the ways in which teachers processed and made sense of the theory in relation to their own children within the culture and context of their kindergartens. Through symbols such as resources and language inherent within their context, the participants interpreted the study to make meaning for themselves as professional teachers and for their professional practice with children. Therefore, while some reference is made to the literature explored earlier in this discussion, the following analysis presents new and original knowledge, not currently available in the literature.

1. Schema learning theory draws greater teacher attention to children’s thinking and identifying working theories

Theme One forms the platform for the epistemological grounding of the further three findings of the study. In Chapter Six, significant qualitative data was shared to describe how teachers became more aware of children's thinking and possible ‘working theories’. Through their ongoing exploration of schema learning theory in Phases Two and Three of the research, teachers were increasingly giving examples of how they were noticing and recognising children’s thinking. Teachers explored how possible observations of a schema suggested a line of thought or a working theory. In the data underpinning Theme One, teachers repeatedly referred to their previous pattern of focusing on children's learning from a dispositional lens, now considering the contribution schemas might have

for ongoing practice. Schema learning theory meant so much more to these teachers than Athey's (2007) labeled behaviours.

The teachers immersed themselves steadfastly into the cognitive constructive process of the schema itself, highlighting multifaceted angles they could use the theory to make sense of practice. The teachers found the theory useful to build and maintain relationships with children in ways they had never experienced before and additionally, they explored alternative teaching approaches and strategies they had not used before. They observed and listened with greater interest to what children were really showing them.

Alongside examples of noticing children's thinking was the teachers' own processing and 'making sense' of new theories and understandings. The significance of the teachers developing their own 'working theories' was not lost on the teachers. In Chapter Seven, the data provided many examples of how through collaborative engagement and rigorous professional learning, they were able to provoke and extend each other's thinking and understandings. For example, teacher highlighted shifts in their thinking around the nature of children's working theories and learning dispositions and how they might work. Additionally, teachers found meaning in the complex ways in which learning dispositions and working theories are interrelated within the context and framework of *Te Whāriki* (Ministry of Education, 2017).

It is significant to note, as a result of this research, that the professional learning offered in Phase Two of the research, facilitated significant growth in teachers' confidence to notice, recognise and articulate a view of children's thinking, with increasing awareness of thinking reflecting possible 'working theories'. As a result, teachers' professional pedagogical practices were significantly

transformed ensuring greater teacher attention to children's thinking and confidence to identify working theories. Once the participants became cognisant of the depth of the children's thinking, they positioned themselves to explore further understandings of their own role, to explore their deepening relationships with children and how knowledge of the complexity of a schema was useful for them as teachers.

2. Teachers have a significant role in extending schematic thinking as children engage in their learning

The importance of adults/teachers being involved in recognising and extending schemas is significantly reflected in examples of earlier research as evident in Chapter Two of this dissertation. Prior to this research the teachers were heavily immersed within a socio-cultural, dispositional foci of thinking about children's learning, so it made sense that they came into this study with questions about how they might be involved in what children were doing, rather than standing back and taking an observational role. Socio-cultural theories suggest the teacher has a significant role in noticing and extending learning dispositions and working theories through language, engagement, planning, and assessment (Vygotsky, 1986; Carr, 2001).

As teachers deepened their understanding of schema in relation to their current practices and thinking, they became increasingly eager to explore their own role. To support the teachers in this exploration, we collaboratively engaged with extended literature in an effort to create a framework for the teacher's role.

In addition to considering how children in the study displayed their thinking through behaviours identified as schemas, the teachers also explored how adults could support children through identifying schemas and thinking about further learning. Their findings suggested that for children

to be able to flourish, teachers and adults needed to actively work alongside, to attend to and shape the learning environment taking into account cognitive thinking. The participants were able to draw on earlier research to critically analyse their own contribution and collective decision making as they responded to children's schema and working theories in their context.

Theme Two captures the teachers' increasing use of intentional language specific to the action schema, specifically directional language. Increasingly recognising as they added language to encourage, direct, explain or continue an action, they were influencing and adding complexity to the action schema and the child's 'thinking' (van Wijik, 2008). Examples reported in Chapter Six showed how children also began to use the intentional language they heard from teachers. Through teachers intentionally using language congruent to these learning areas, the young learners in this study were provided with the structures and frameworks to develop more complex thinking and utilising understandings or schema at more abstract levels of engagement. Within their socio-cultural framework of noticing and recognising learning (Carr, 2001), theme two captured the significant finding that confirmed that the teachers became more confident to 'respond' to the 'thinking child' with the addition of schema learning theory to guide their decision making (Athey, 2007).

The proposition that was central to Theme Two confirmed that the teacher's role is critical to adding complexity to children's thinking and learning. Through teachers utilising schematic approaches to children's actions and understandings, this study provided evidence of how schema can be used alongside socio-cultural teacher pedagogy to add complexity to children's working theories.

3. Engaging with schema deepened relationships with children

Theme Three validated the teachers' perspectives on the significance of their transforming pedagogical practices in relationships with children within the learning environment. The proposition presented in this theme is built on data that captured teachers' exploration of how their role was critical to understanding particular behaviours or schema, and how as participants and early childhood teachers, they might be able to explore this thinking with the child. The participants reported that as teachers, they tended to think of the learning environment as the teachers' domain, where children benefit from the routines, events and boundaries teachers create, arguably created in the best interests of the children. However, allowing children to fully explore their schematic interests meant teachers had to share what happens in their environment more with children.

Sharing the decision making in the environment with children meant teachers felt they were able to more responsive to what they were noticing in children's engagement and thinking, therefore experiencing enriched interactions and relationships with children. This was particularly the case where some participants reflected on children whom they did not have a strong relationship prior to the research. This was a significant finding of the project and will make a strong contribution to the development of schema-based teaching in early childhood education in Aotearoa New Zealand.

It can be concluded here that as a result of the data analysis, the teachers became more aware that creating a learning environment for children was not the sole responsibility of the teachers themselves, rather the idea that a 'children's learning space' is also created by children. Through the participants' engagement with schema learning theory and working theories, they developed the

perspective that creating a learning environment is equally about the contribution from the children as much as by themselves as teachers. As the participants engaged within the additional theory of schema to support their understanding and practices with working theories, they realised that their role as the teacher was to support a more complex set of learning possibilities than they had prior to the study.

Through the three phases of data collection and concurrent analysis, evidence was generated that confirmed that teachers were able to understand children and respond to them in positive ways resulting in developing deeper relationships with children. Teachers reported they were responding to children in more positive and constructive ways due to being more open to what they might be 'thinking about'. Evidence was provided in earlier chapters that the participating teachers became aware of the positive changes in learning relationships because these children significantly transformed in their participation and positive engagement with them. As a result of the transformation in pedagogy, teachers reported that their children increased their physical contact and attachment with the teachers themselves. Further, it was the teachers' view that the children they collected data on, seemed overall more settled and happier in the centre programme each day. Therefore, this research provided data that confirms the proposition that when teachers think more deeply about why a child might be exploring or doing what they are doing, they develop a greater understanding of the child's thinking, therefore developing a deeper connection and relationship. As a result, teachers reported that once they had this insight into a child's thinking, they were more able to delve into further possibilities, potentially enabling the child to feel more understood and therefore valued in the learning space.

The teachers agreed that across the contexts, using affirming statements and probing questions were useful to ascertain what the child might be doing and thinking. Children whose challenging behaviours were identified and acknowledged by the participants in negative ways, were observed and schemas identified to form positive pathways ahead in learning. The participants described this as the transformative nature of their engagement with the schema, which ensured teachers were able to create a stronger and more positive relationship with each child.

Additionally, the teachers reported children developing more positive and engaging relationships between themselves. The data suggested that as the teacher interacted with children using language related to a schema, children with similar schematic interests were drawn into the experience and created new relationships and interactions with children they would not have normally spent time with. Through the children's collective interests, teachers were more able to hypothesize on the children's possible working theories or what they might be thinking about.

In conclusion, the propositional knowledge that this research has generated in this study confirms that as relationships between teachers and children, children and children, strengthened through shared interest, working theories in their thinking had a greater capacity to be explored. Teachers reported they were able to 'use the schema' as an addition to their existing frameworks for learning as they had more confidence to identify 'thinking' through children's interests and participation.

4.Children move through 'stages of cognitive thinking' as they explore their schemas and working theories

For myself, Theme Four was the most unexpected theme from the data analysis. Children's stages of schematic thinking were briefly introduced in Phase Two, however, became a significant thread

of discussion when the teachers read further, and began to ask questions about the relevance of stages in schema development. During the professional learning in Phase Three, teachers were introduced to Meade and Cubey's (2008) stages of schematic cognitive thinking. The evidence presented in the earlier chapters demonstrated teachers witnessed that this learning progression outlined in the existing literature (eg., Meade and Cubey, 2008), also occurred in their early childhood environments and was enabled by the teachers and their newly reconstructed teaching practices.

Initially when the teachers decided which children they were going to focus on at the beginning of phase three, they reflected on why in hindsight they all chose younger or newer children to the kindergarten. As their awareness of schema developed, they hypothesized that a reason for this was they were able to observe the ways in which children were exploring physical/concrete materials. In the data they questioned why they had not chosen older or more experienced children and rationalised they were looking for the most observable stage of schema development, resulting in choosing the younger children who might be still establishing schema in their interests, actions or processes. Atherton and Nutbrown (2013) stressed the importance of teachers understanding schemas as stages of learning. They suggested unless teachers understand the progressive nature of the schema, they are unable to establish a foundation on which to provide further opportunity for complexity in thinking. Anne Meade (2005) drew attention to the importance of teachers' awareness and understanding of progressions in children's schema learning, specifically how schema learning becomes more complex over time. Likewise in this project, the participants drew from examples of children over time, noticing changes in the ways children engaged with their schemas and how the language they used became more complex.

Interestingly, the teachers did not recall any significant development with their thinking in the symbolic representational stage of the schema. However, teachers were able to describe occasions where children seemed to progress into more abstract levels of thinking. For example, using complex language and description, explanation and discussion in their schema development. Additionally overtime, they observed children using concrete materials less but becoming more able to talk the schema through.

What was witnessed here is significant in terms of the purpose of the study. As the teachers' understanding of the development of a schema from a concrete to an abstract stage, they were more aware of their older learners and how they might be thinking and articulating their understandings of how a schema worked. This was evidence of teachers' growth and development through their reflective practices which enabled a deeper understanding of the child's thinking and ultimately, their working theories about that area of interest. The teachers reported with conviction that observations made of children using a schematic lens, provided information for them about children's language, communication, social and emotional learning. Importantly teachers in this research noted a deeper understanding about the child's abstract thinking. "Showing curiosity about objects and using senses to explore the world around them… showing particular interests" (DfE, 2012, p. 6).

In this sense the teachers reported that not only had their confidence as thinking teachers increased but they were in a stronger intellectual and pedagogical position to integrate their new learnings into their existing practices working with learning dispositions. Therefore, it is significant to note at this point that schema learning theory can complement practices in working with learning

dispositions and working theories required within curriculum implementation (Ministry of Education, 2017).

8.5 Summary of findings

On reflection and bringing the themes to a conclusion, several findings of the study are now presented based on the complex analysis of the data across Chapters Five, Six and Seven. These include the following:

- The study has provided evidence that the framework of schema learning theory has a critical role to enable teachers to tune into children's thinking and to understand their working theories. The teachers in this study experienced increased confidence as professional early childhood educators to identify and begin to respond to children's working theories.

- Teachers expressed that their ability to recognise children's schematic stages of thinking, gave them capacity to understand children's intentions, and build complexity in children's thinking and learning.

- Understanding children's schema's and working theories enabled the teachers to understand children's intentions and build and maintain more positive relationships with children than they had previously.

- Teachers embraced the opportunity to learn how they could utilise schema learning theory alongside their current practices with learning dispositions, facilitating repertoires

of practice that extended the children's working theories. Through this process teachers collaboratively developed belief in their own abilities to autonomously make decisions about their own curriculum delivery and pedagogy.

- The thematic propositions build a substantive theoretical argument that the teachers in this study became capable of creating experiences for children to practice using higher order thinking through the exploration of their schemas, and, also as practitioners, confident to talk to and extend children in their cognitive understanding.

- The dynamic perspectives of the teachers over the duration of this study have confirmed that the active identification and understanding of a schema has the capacity to create opportunities for teachers to ask questions, poise and ponder about the child's thinking and working theories.

- Teachers were confident that schema learning theory would become ingrained within their existing practices in noticing, recognising and revisiting children's learning. Learning stories and assessments on children would be framed by learning dispositions, working theories and schemas.

8.6 Revisiting the literature - Making a contribution to the early childhood sector

In Chapters One and Two it was revealed that historically in Aotearoa New Zealand, teachers have been reluctant to focus on children's intellectual or cognitive learning in early childhood education.

This was substantiated by Anne Meade (1998), Pam Cubey (1995), Chris Athey (1990) and Cathy Nutbrown (1999) in their research which also highlighted teachers' hesitancy to engage within children's cognitive development when planning for learning (Meade, 2006).

> "Observation suggests that teachers are reluctant to accept an interactive role in relation to children's cognitive development, to scaffold their learning about thinking. Research about thinking children shows that even when teachers volunteered to join an action-research project which aimed at facilitating children's cognitive development, they were more likely to facilitate children's "working theories" by adding in different material and equipment, than to help children by talking to them" (Meade, 1996, p. 39).

Meade's quote (1996) highlights the ongoing struggle that teachers in Aotearoa New Zealand experience when historically, the theories of teaching and learning required pedagogy that was shaped by the developmental perspectives of learning, where typically, the teacher's role was to set up the environment and then take a 'step back' from the children's engagement. Since 1996 there has been a greater influence on teaching pedagogies from socio-cultural theories, encouraging teachers to be more involved in processes of scaffolding and the co-construction of learning (Vygotsky, 1978; Rogoff, 2003, Hedges, 2022). Socio-culturalism and *Te Whāriki* (Ministry of Education, 1996; 2017) requires teachers to focus on children's 'working theories' central to their daily teaching and curriculum aspirations for learning. However, as the literature has shown, this hesitancy was still evident at the outset of the research, long after Meade's (1996) comment above. In another example, Barbara Jordan noted:

> "Research in early childhood services demonstrates that staff beliefs are often based on developmental theory, and that their interactions with children tend to be of a superficial nature, seldom succeeding in tapping into children's thinking, let alone challenging and extending thinking through scaffolding learning" (2009, p. 31).

As discussed in earlier chapters, the role of the teacher as the ‘observer’ was interpreted from Piaget's (1950) earlier work on the view of the child as being ‘the lone scientist’, in other words the child was to engage in an environment independently to construct cognitively on their own, developing understandings of their own world. Therefore, this being the theory of that day, meant the teacher was to sit alongside and observe and not interfere nor offer anything in the moment to affirm nor challenge the child’s intellectual perceptions of what might be happening. Ironically, it could be argued that if the teacher takes an observational role only in children’s learning, this could produce opportunities for more child-led schematic development. Therefore, if the teacher has no knowledge or experience of schema, the thinking of the child may be led in alternative directions by the teacher trying to lead the child as a more ‘expert other’. However, exploring the implications of teachers not being involved directly with children in their learning is an additional research project and beyond the scope of this research.

However integral to the context of this study was that at no time during this research did the participants consider their role as that described by Meade (1996) and Jordan (2009). In Meade’s later work in 2006, while she suggested that a substantial percentage of teachers still reflected developmental styles of teaching as standing back from being involved in children’s learning, increasingly teachers were being encouraged by socio-cultural research and theories to engage with children’s working theories. However, this researcher would argue that historically this expectation has not been well supported with any substantial frameworks of reference within the research and theory and still remains a challenge for teachers today.

The purpose of this inquiry was not to engage in the dichotomy of whether schemas were of biological or socially constructed origins, as is often the debate within schema development (Athey, 2007). The origins of schemas being biological or innate as suggested by Piaget (1950) discussed in earlier chapters, was also not a relevant position to the focus of the study, nor significant to the findings of the study. This is also the stance that authors Mead and Cubey (2008) presented in their studies. This study explored what teachers might be able to do with 'the theory' itself, regardless of origins, to ask if it has relevance in making sense of the socio-cultural practice of identifying and responding to children's working theories in today's theories of teaching and learning. The study asked the participants to consider, with the literature and research available, to collectively explore what schema learning theory offered to strengthen teacher confidence with working theories in their current practice. In other words, the teacher participants were challenged to engage with the framework of schema in an effort to enhance their collective confidence and to recognise and respond to children's thinking through schema learning theories in ways that were new to their professional repertoires of practice.

Attempting to make meaning from the data and creating subsequent analysis of findings is a problematic task in qualitative research (Creswell, 2014). Drawing from the findings of this project, I drew attention to the concern that Piaget's constructivist approach to 'thinking' has largely been marginalised over time due to misunderstandings and the favoured socio-cultural theories of Vygotsky (1986), Bronfenbrenner (1986), and Rogoff (2003) heavily influencing early childhood curriculum reform in Aotearoa New Zealand. However, this has been at a cost as developing children's 'working theories' remains a key outcome from the curriculum aspirations, however little work has been done to support teachers in the development of their understanding of what working

theories involve. While aspects of Piaget's theory have been highlighted as useful for working theories such as the cognitive processes of developing equilibrium and disequilibrium in thinking (Lovatt & Hedges, 2014), this study adds evidence schema as a framework has a critical role for teachers to tune into children's thinking to understand working theories. Working theories have remained a curriculum aspiration in the framework of *Te Whāriki* (Ministry of Education, 2017) for almost 30 years of curriculum development and reform, and yet many teachers are still ambiguous about how to develop this in their practice.

Overall, this research substantiates that engaging with children's thinking is a critical role of the teacher. Teachers need frameworks for strengthening their confidence to work with children's cognitive development and strategies to recognise what a child might be thinking, and how to support children to understand their world. Ultimately this study argues that when teachers work more confidently with working theories, this will foster robust learning dispositions as both learning dispositions and working theories are valued by *Te Whāriki* (2017) and will hold equal value for the teachers working with children.

8.7 In Summary

The need for teachers and those working with early childhood aged children tuning into children's thinking is by no means a new concept. As far back as 1996 Meade wrote:

> "Exploration (a principle in *Te Whāriki*) includes a goal to do with children developing working theories for "making sense of the living, physical and material worlds". If teachers were to adopt a Vygotskian perspective, they would see it as incumbent on them to tune into the children's thinking and actively help them to develop their capacity to theorise. In other words, teachers would accept that children need help, support and guidance with their thinking, as well as with the acquisition of practical skills" (p. 38).

Arguably teachers are still grappling with making sense of how to identify and respond to children's thinking as working theories almost thirty years later. By the close of this research as has been argued above, teachers provided evidence-based reports that through engaging with schema learning theory, their pedagogical practices have transformed to a point where they were intellectually and pedagogically confident and adept in integrating schema's into their existing and evolving practices. Teachers in this study acknowledged that this new way of conceptualising children's learning through a 'thinking' lens and no longer just through a singular learning dispositional lens, deepened and strengthened their practice as teachers. This transformation was based on new pedagogical practices that the teacher's reported including:

A desire to ask themselves, critical questions about children's intentions but also their responses; and

New ways of working that enabled teachers to re-focus on children's thinking as motivating particular actions.

The key implications of the thesis are many; however, the most significant are closely woven to the aspiration and intent of the research question itself: Can schema learning theory help teachers to make sense of children's working theories? The short answer is yes. The teachers in the research project were not only more confident in understanding 'working theories' but competent in their verbal and written descriptions of children which they shared in small groups. From tentative beginnings, grew an eagerness to grow, learn and discover ways of understanding their children that they had not experienced before. Out of the unknown, came understanding and enlightenment. The qualitative data from this study demonstrates there is real interest in re-constructing their role as

teachers in early childhood education. Teachers are in fact open and responsive to additional ways of thinking, in this case, ways of viewing and thinking about their learners. This study was designed to focus on teachers' perspectives on identifying and making sense of working theories. While teachers in this research study were more able to recognise a child's working theory, there was no scope to explore how teachers could further support children's working theories as part of this study. However, this could be a focus of a new study going forward.

In this concluding chapter it is argued that the research findings of this study make a significant contribution to the Aotearoa New Zealand context of teaching and learning, namely how teachers, through specific interventions, can significantly contribute to children's thinking and working theories (also highlighted by Mead & Cubey, 2008, Whalley, 2004, Arnold, 2010, Nutbrown, 1999 & Atherton & Nutbrown, 2013). A significant finding from the data analysis indicated that the participants had a greater awareness of 'childrens' thinking' as an integral component of their professional work. This 'thinking child' has historically been silenced or lay dormant due to a lack of probing.

In some of the final reflective discussions about how to work with schema in practice in the future, a teacher said:

> '....if we only take a learning dispositional lens at learning, there couldn't be any significant shift in their disposition due to the dominance of their schema' (PS, KL, Interview 4).

This insightful reflection suggested that if teachers do not engage with what children are thinking, there cannot be any progress in children's learning dispositions, reinforcing the critical relationship between learning dispositions and working theories in *Te Whāriki* (Ministry of Education, 2017).

8.8 Recommendations for research, policy, and practice

As the researcher was immersed with participants in the research, recommendations from the project will be two-fold. The first set of recommendations are made due to responses from participants when asked what capacity they felt schema learning theory had for the wider early childhood sector and teachers practice. The teacher's evolution of perspectives throughout the study have come from examples of the data and overall themes of the findings. The second set of recommendations come from myself as the researcher. Two sets of perspectives on the research are deemed necessary as the researcher's experience was different from that of the teachers, both valued within the epistemology and methodology of the research project.

8.9 Recommendations from the teacher's data

The following quote from one of the participants requires attention and sets directions for future research, policy, and practice:

> "There needs to be more understanding that schema are how tamariki are exploring their working theories of why certain things happen when 'done' in certain ways. It is vital that nga tamariki [children] also strengthen their dispositions, so they are inclined to act in competent ways. Barriers can go up, not by tamariki themselves, but by kaiako; whanau, for nga tamariki because they are annoying, messy, disruptive… Please, M [researcher], make sure that this research 'gets out there' amongst ECE circles / training / mentors of education. Wilton Playcentre was unique but now so is [our place] – let's get it out there and I feel we are beginning to do so, I know I am" (JH, final reflections on the project).

Teachers' recommendations:

- There needs to be a greater awareness of schema learning theory within current practice to support teachers to identify and respond to children's working theories.

- Teachers in early childhood education need opportunities to work collectively to observe, recognise and reflect on children's repetitive behaviours, and to speculate about what the child/ren might be thinking about from a schematic perspective.

- Teachers need to be provided additional frameworks, such as schema learning theory to support them to identify children's thinking, rather than only focusing on children's learning dispositions.

- Teachers need further opportunities to engage in quality qualitative research underpinned by symbolic interactionism to strengthen relationships, pedagogy and practice.

- Symbolic Interactionism creates opportunities for teachers to collaborate, be vulnerable and open to the perspectives of self and others. Teachers are able to be responsive to new learning, take ownership of their own thinking and learning.

8.10 Recommendations from the researcher

The following recommendations are made by myself as the researcher for policy and providers of initial teacher education. Recommendations are followed by suggestions for future research and a conclusion to the study.

I did not make recommendations for the future of *Te Whāriki* lightly (Ministry of Education, 2017). However, this research drew attention to the need for a more structured frameworks within *Te Whāriki* (Ministry of Education, 2017) to support and enable teachers to more confidently engage with children's working theories alongside their practices with learning dispositions, both equally valued within *Te Whāriki* (Ministry of Education, 2017).

Therefore, as the researcher I make the following recommendations for policy:

- At a future time of review, writers and the Ministry of Education consider including the additional framework of schema learning theory within *Te Whāriki* to support teachers to bring value to children's working theories in their current practices.

- The New Zealand Ministry of Education fund professional learning opportunities for teachers in early childhood education to explore additional theoretical frameworks of learning to enable teachers to identify and respond to children's working theories, using schema learning theory as an example. Professional learning for teachers to enable them to extend and support children's working theories would be effective for the overall implementation of the early childhood curriculum, *Te Whāriki* (2017).

And:

- The New Zealand Ministry of Education funds professional learning opportunities of interest for teachers that motivate, inspire and promote collaborative meaning making and insight into practice. Long term projects underpinned by a theoretical framework in symbolic interactionism would be recommended.

Researcher recommendations for initial teacher education providers:

- Initial teacher education providers of early childhood education need to value and teach critical thinking when examining the epistemology of Jean Piaget's (1950) theory of schematic learning and other cognitive constructivist theories, to teach students how learners construct their thinking and possible working theories.

- Initial teacher education programmes focus on a wider range of research in Aotearoa New Zealand to support beginning teachers to identify and respond to children's working theories in their full implementation of learning valued within *Te Whāriki* (Ministry of Education, 2017).

8.11 Recommendations for future research:

- Current assessment models in early childhood education include bringing value to learning dispositions and working theories through highlighting this valued learning in learning stories, underpinned by the principles and strands of *Te Whāriki.* Future research could involve developing a model of assessment to include elements of children's schematic thinking to support their working theories.

- Towards the end of this project the teachers were asking questions well beyond the scope of this study. Of significant interest was how children who hold similar schemas manage to find each other in the environment. The teachers were keen to explore what they could do to support and bring complexity to their collective schema and potential working theories. Further research to investigate what motivates and draws children together in their schematic thinking, and how teachers could support this collaborative engagement further would be interesting.

- To explore longitudinal research on children's schematic development through early childhood, more formal learning environments into adolescence and adulthood. If a greater focus on children's schema at a young age was supported throughout their education, it would be interesting to see the impact of this in later years i.e., in terms of on-going education, employment and quality of life as an adult.

- The methodology of this study enabled, enriched and empowered teachers in their meaning making, developing further confidence in their professional expertise. Further research underpinned by symbolic interactionism would be beneficial for teachers' growth and development.

8.12 Limitations of the research

This study has generated new and significant insights regarding teacher perspectives in tuning into children's thinking in early education settings through engaging with schema learning theory in an effort to understand children's working theories. However, there were identifiable

limitations to the study, and it is important to acknowledge these when proceeding with recommendations that stem from the research.

8.13 Labeling children's behaviours

In the professional learning session in Phase Three, teachers were given the strategy that a schema could be identified through a child's annoying behaviour (Athey, 2007). While initially this was a useful strategy for teachers to be able to notice and pinpoint possible schemas, looking for annoying behaviours limited their observations to just that; annoying. During the professional learning session in Phase Two, teachers used this strategy to quickly identify children who might be involved in a particular schema labeled by Athey (2007). However, while in the data there was evidence that teachers were exploring their own discourse into why they found some behaviours annoying, additionally they began to notice and explore further, more non-annoying behaviours to speculate about. Consequently, there was a considerable scope for further behaviours to be explored beyond children identified as 'annoying' in this study.

8.14 Schema learning theory and learning dispositions

What was beyond the breadth of the study, was a deepening understanding of how schema learning theory can work in a congruent way with learning dispositions. While this research has demonstrated significant outcomes in terms of teachers developing deeper understandings of working theories, progressions in schema thinking, and deepened relationships, there were only brief occasions in how schema might work in unison within their existing practices with learning dispositions. The data showed significant evidence of the teachers trying to make sense of what the child was trying to 'figure out' in terms of a possible working theory, but not how this related to their perspectives of learning dispositions. A dispositional lens on schema and working

theories is critical for children as they develop working theories about self and others (van Wijik, 2008).

8.15 Conclusion

Schema learning theory has much to offer teacher practitioners in their practices in identifying and responding to children's working theories. Schema theory asks teachers to think deeply about how they understand their learners, and to consider if they are really engaging with what they are noticing about the children they work with. The theory asks teachers to consider a range of possibilities of why a child might be involved in an action, process or interest. For example, a repetitive behaviour, or when a child is consistently drawn back to an interest, action or process, even when offered an alternative experience. Such behaviours or actions should not go unnoticed and need to be problematised and probed for meaning.

If teachers are to extend the scope of their perspectives wider than a learning dispositional lens to identify and respond to children's thinking, there is much to be explored and learned. This research project has demonstrated that schema learning theory can create opportunities for teachers to engage with children's working theories. Teachers in this study overwhelmingly recognised that through engaging deeply with children's thinking, they developed significantly increased positive relationships with children and were able to respond to children's thinking with more complexity through utilising intentional language and offering additional experiences within the child's schematic thinking. The wider research in schema learning theory (Meade & Cubey, 1995; van Wijik, 2008) suggested thinking children are not isolated from each other. The research in schema suggests children with similar schemas are drawn to each other, and when teachers recognise the collaborative nature of children's thinking, they are able to bring learning opportunities to children

which not only promote their schema, but their learning dispositions in exploration, collaboration and participation. Beals (1998) said “schemata are not individual, isolated constructions, but culturally shared patterns of organising knowledge and experiences” (p. 9).

Exploring children’s understandings of how their world works is a fundamental process for equipping learners with the knowledge, skills and attitudes they need as current and future citizens in Aotearoa New Zealand. Therefore, teachers who tune in, observe, and listen to children’s inquiries, questions, and curiosities about their world, can provoke and consolidate their working theories. Schema learning theory provides teachers a framework to enable this process to evolve.

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Appendix A - Ethics Application

Dear Applicant,

Chief Investigator: Dr Tonya Rooney
Co-Investigator: Professor Tania Aspland
Student Researcher: Ms Meredith Kelly
Ethics Register Number:2020-235H
Project Title: Teacher perspectives on children's 'thinking' in learning and assessment
Date Approved: 6/03/2021
End Date: 31/03/2022

This is to certify that the above human ethics application has been reviewed by the Australian Catholic University Human Research Ethics Committee (ACU HREC). The application has been approved for the period given above.

Continued approval of this research project is contingent upon the submission of an annual progress report which is due on/before each anniversary of the project approval. A final report is due upon completion of the project. A report proforma can be downloaded from the ACU Research Ethics website.

Researchers are responsible for ensuring that all conditions of approval are adhered to and that any modifications to the protocol, including changes to personnel, are approved prior to implementation. In addition, the ACU HREC must be notified of any reportable matters including, but not limited to, incidents, complaints and unexpected issues.

Researchers are also responsible for ensuring that they adhere to the requirements of the National Statement on Ethical Conduct in Human Research, the Australian Code for the Responsible Conduct of Research and the University's Research Code of Conduct.

Any queries relating to this application should be directed to the Ethics Secretariat (res.ethics@acu.edu.au). Please quote your ethics approval number in all communications with us.

We wish you every success with your research.

Kind regards, Kylie Pashley
on behalf of ACU HREC Chair, Assoc Prof. Michael Baker
Senior Research Ethics Officer | Research Services | Office of the Deputy Vice-Chancellor
Australian Catholic University
T: +61 2 9739 2646 E: res.ethics@acu.edu.au

Appendix B - University of Otago Human Ethics Committee, University of Otago, New Zealand

22nd February 2021

Ms. Meredith Kelly
Academic Programmes Coordinator
College of Education
University of Otago
Dunedin

Dear Ms. Kelly,

Re: Teacher perspectives on children's 'thinking' in learning and assessment, Australian Catholic University, application ID: 2020-235H

Thank you for advising the University of Otago Human Ethics Committee that you are undertaking the above project as part of your PhD at Australian Catholic University (ACU).

The University of Otago Human Ethics Committee has reviewed your proposal as set out in the ACU Human Ethics Application and have indicated that there are no issues of ethical concern which you have not already addressed and approves the proposed conduct of the research.

Once final approval is granted by ACU, please provide evidence for our records.

Yours sincerely,

Gary Witte
Manager, Academic Committees & Services
University of Otago

Email: gary.witte@otago.ac.nz

Appendix C - Information and consent form for employer of research sites

March 2021

To: The CEO Kindergartens South

RE: Approval for research within kindergartens in Southland

Kia ora koutou

My name is Meredith Kelly and I am a Doctoral student with Australian Catholic University. While I am enrolled in an Australian University, I live and work in Invercargill at the College of Education Invercargill Campus. I am writing to Kindergartens South to seek permission to undertake a PhD research project in 2 kindergartens within your association.

The staff in the two kindergartens selected for the study will be asked to participate in an initial professional learning session. Following this they will participate in organised interviews and spend time recording data for the research. This expectation has been designed to fit within teacher's non-contact time and as such, should have minimal impact in their overall workload. At all times the responsibilities of their role in the kindergarten takes priority over the research project. I will negotiate with staff suitable days and times that fit their workload.

Please find information relevant to my research attached for your consideration. If you consent to the research, please sign the attached consent form and return it directly to me at my email address.
This research has been approved by the ACU Ethics Committee, number 2020-235.

Please let me know if you have any further questions regarding the research proposal.

Kind regards

Meredith Kelly

Appendix D - Consent from employer to approach kindergarten teachers

PROJECT TITLE: "Teacher perspectives on children's thinking in learning and assessment'
APPLICATION NUMBER: (2020-235)
PRINCIPAL INVESTIGATOR: Dr Tonya Rooney
STUDENT RESEARCHER: Meredith Kelly

Board of Governors Signed Consent

I/~~We~~ [redacted] (With authority on behalf of *Kindergarten South*) have read (*or, where appropriate, have had read to us/me)* and understood the information provided in the letter to Kindergartens South. Any questions we have asked have been answered to our satisfaction.

- We/I agree that interested teachers employed within Kindergartens South are able to participate in this research project.
- We/I understand that the research project is anticipated to take approximately 10 months.
- We/I am aware that any images of children used for data collection will be unidentifiable. All images, learning stories and observations will not contain the child's real name and will be stored at the kindergarten. Children's identities will remain anonymous.
- We/I agree to the data collected and analysed to be digitally recorded and to be stored at the researcher's place of employment.
- We/I realise that the researcher will not have direct contact with any child at any point.
- We/I give our permission for teachers in the study to discuss children's learning relevant to the study with the researcher (alongside parent/whanau consent)
- We/I realise we can withdraw our consent at any time (without adverse consequences).
- We/I agree that research data collected for the study may be published in a form that does not identify the kindergarten, teacher participants or children in any way.

NAME (on behalf of Kindergartens South): [redacted]

SIGNATURE: [redacted] DATE: 5/4/2021

SIGNATURE OF STUDENT RESEARCHER (if applicable): ..... DATE: .....

Appendix E - Invitation to participants to join study

October 2020

To: The Kindergarten Kaiako

Re: Invitation to participate in a research study

Kia ora koutou

My name is Meredith Kelly and I am a Doctoral student with the Australian Catholic University. While I am enrolled in an Australian University, I live and work in Invercargill at the College of Education Invercargill Campus.

You are invited to participate my research project titled: "Teacher perspectives on children's thinking in learning and assessment'. I am approaching interested kindergarten teams of 3-4 teachers working with children of 3-4 years of age. I wish to connect with teachers who are interested in exploring their perspectives on children's thinking within their learning and assessment practices.

The key research question is:
What are teacher perspectives on how to identify and assess children's working theories within their current socio-cultural practices?

Please find information relevant to my research project attached for your consideration. If you are interested in the research, please sign the attached consent form and return it directly to me at my email address or contact me for further information.

Please let me know if you have any further questions regarding the research proposal.

Kind regards

Meredith Kelly

Appendix F - Research information sheet and consent form for participants and parents

PROJECT TITLE: "Teacher perspectives on children's thinking and working theories"
APPLICATION NUMBER: (2020-235)
PRINCIPAL INVESTIGATOR: Dr Tonya Rooney
STUDENT RESEARCHER: Meredith Kelly

Dear Colleagues/Parents,

You are invited to participate in my research project titled: "Teacher perspectives on children's thinking and working theories'. I wish to connect with teachers who are interested in exploring their perspectives on children's thinking and working theories.

The key research question is:

What are teacher perspectives on children's thinking and working theories within their current socio-cultural practices?

What is the project about?

The aim of this research is to explore early childhood teachers thinking about children's thinking and working theories within their practice. The study explores teachers' conceptual perspectives of children's thinking and working theories within their setting. Historically teachers' individual perspectives on children's thinking have been constructed through their initial teacher education and subsequent teaching experiences. Teachers perspectives on exploring children's working theories is reflected in practice and through their documentation of children's learning. This study aims to explore teacher's perspectives on children's thinking and working theories by drawing on two congruent theories of learning. The individual and collective perspectives of the teachers in this study are of interest and will play a part in shaping the qualitative direction of the methodology.

Who is undertaking the project?

This project is being conducted by Meredith Kelly and will form the basis for the degree of PhD at the School of Education at the Australian Catholic University under the supervision of Dr Tonya Rooney and Professor Tania Aspland. Dr Tonya Rooney is a Senior Lecturer in Early Childhood Education and has undertaken a several qualitative research projects, in collaboration with community and research partners, including a recent project (2017-2020) that received international grant funding. Tonya's publications include a number of book chapters and journal articles in highly ranked Australian and international education journals. Professor Tania Aspland most recently held the position of Professor in Teacher Education at the Australian Catholic University in Sydney. She was previously Professor and Head of Education at the University of Adelaide. She

has been a leader in course development in teacher education for many years and is currently engaged in a number of research projects in higher education pedagogies in teacher education undergraduate and graduate courses, particularly in relation to professional standards and evidence-based assessment. Tonya and Tania both have extensive experience and expertise in supervising qualitative doctoral study.

What does participation involve?

You are invited to participate within a full-scale research study with the researcher. The estimated timeframe for this research project is 7 months. The research will be conducted at your centre through a series of organized meetings, times which will need to be negotiated. The focus of the meetings is to explore your perspectives and to make sense of children's working theories, therefore, the nature of meetings is interpretive and open ended.

The methods for data collection will involve 4 meetings over 7 months.

- **Meeting one –** The focus of this initial meeting is to openly discuss your existing processes of interpreting and making sense of children's learning.
- **Meeting two – Professional discussion on working theories –** The focus for this meeting is for us to engage in high quality professional learning on working theories (inclusive of the theory of schema learning)
- **Meeting three –** The purpose of this meeting is to discuss your ongoing perspectives of children's working theories and consider any implications for your practice.
- **Meeting four –** Final Interview – The focus of this meeting is on how useful the concepts of working theories are for your teacher repertories?

Once you have completed the initial professional learning session (meeting two) on schema and working theories, you will be asked to begin to gather examples of images, observations and learning stories of children to be used in meetings 3 & 4. To enable the identity of your chosen child to remain anonymous, photos cannot show the faces or reveal the names of the children. Their real names cannot be used in observations and learning stories but can be replaced with a pseudonym. You will be asked to provide an information letter to associated parent's/family and seek their written consent for these examples to be used within the research (provided by the researcher). Any information that the researcher decides to use from the examples will be deidentified. The consent letter to parent's/families sets out the privacy and security protections which will apply.

The meetings will be conducted at your kindergarten and done at a time that is negotiated to suit your schedule. There will be four meetings in total. At each of the meetings, each participant will be asked to bring along examples of learning stories they have developed and images of children to share with the rest of the group. In addition to the meetings, you will be asked to spend approx. half an hour each week recording your on-going learning and reflection between meetings. The researcher will not collect copies of learning stories and images however these will be stored at the kindergarten for ongoing discussions.

Some examples of questions might include:

- What process are you going through to identify children's thinking and working theories?
- What are your intentions when identifying children's thinking in their learning?

- What strategies do you use to engage with and to realise these intentions? Why do you use these strategies?
- What is the importance of your intentions and strategies?
- What are your expected outcomes of these intentions and strategies?
- What are you hoping to achieve"?
- What reasons do you have for these expected outcomes?
- What are the conditions that promote or impede outcomes?

All participants will also be asked to keep a journal over the duration of the research. The journal enables you to record occasions where you observe children's working theories reflective of the prescribed theories focused on in the research. The journal acts as a place for observations and reflections on your own developing perspectives and will act as a tool to share and discuss with other participants and the researcher. Meetings and will be recorded and transcribed. All data will be non-identifiable.

Are there any risks associated with participating in this project?

While all measures will be taken to maintain full confidentiality throughout the research project, due to the relatively small size of the city of Invercargill and the projected timeframe of 7 months, there is a small risk that individual teachers may be able to be identified as having been involved in the study. Therefore, total anonymity cannot be guaranteed. However, all steps will be taken to minimise this risk and no identifiable information will be included in the final study or related publications. While there are no other foreseeable risks which might cause distress, the researcher anticipates that there could be a risk of some social and emotional discomfort during the interviews. You may be asked questions in relation to your own teaching and learning which require a more individual and reflexive response. The nature of the research methodology asks you as a participant to respond to questions in a meaningful manner which may invoke responses in relation to your own strengthens and reveal possible areas of anxiety or perceived weakness. This can occur when examining your own values and experiences as a teacher. Should this situation should arise, this will be managed in a supportive and non-judgemental manner. You are welcome to choose not to answer particular questions. You are able to withdraw your participation at any time during the project with no risk to your personal or professional standing. If you choose not to participate at any point in the research, no information collected up to that point will be retained or used without your consent. Participants will not be named in any publications. The employer will be fully informed of the intentions of the research project and expectations of your participation. In the unlikely event that you experience any discomfort, you are strongly advised to discuss this immediately with the researcher if you feel comfortable doing so or contact your workplace Employee Assistance Programme (EAP).

What are the benefits of the research project?

Within this study you will:

- be involved in this New Zealand based research and have an opportunity for you to reflect on, and contribute your perspectives of children's thinking and working theories.
- explore two theories relevant to shaping ideas about children's thinking of which, may enhance your knowledge and practice with working theories.

Your participation will contribute to the development of qualitative research, ultimately contributing to wider research into early childhood pedagogy and practice in New Zealand and changing the ways teachers in early childhood think about children and the importance of children's thinking in their learning.

Can I withdraw from the study?

Participation in this research is completely voluntary. You will make your own independent decision as to whether or not you would like to be involved. You will be informed and reminded of your right to participate or withdraw before any interview, without prejudice, at any time in the study.

Data collection, security and storage

All research data will be collected and discussed at your kindergarten. Findings/data analysis from the meetings and journals will then be held at my place of employment within a locked office. No images of children will be collected as part of the research. Images of children will remain at the kindergarten and will be used for discussion purposes only. Parents will be informed and required to give consent for permission to use images and learning stories of their children as part of the research project.

Recording interviews and discussions

I will use an iPad to record meetings that we have at your kindergarten. The iPad will not be used for any other purpose, will be secured with a passcode and kept in a locked cabinet at the researchers place of work when not in use. If you as a participant decide to withdraw from the study before its completion, you will be asked if you are happy for your data to continue to contribute to the overall findings. If you are not happy with this, your data will be removed.

Privacy and security of data

Data will be collected, stored, secured and destroyed when no longer needed in accordance with New Zealand privacy laws and the ACU Data Retention Policy.

Will anyone else know the results of the project?

It is anticipated that the results of the study will be published through New Zealand and or Australian based research journals, and as a thesis document. The researcher will hold the original interview data in a locked cabinet at her workplace. All children's assessments and photos will only be held at the kindergarten in accordance with the kindergarten's usual record keeping practices. Confidentiality and anonymity will be maintained at all times. Only aggregated data will be published and used as examples to illustrate particular themes or developed understandings from the research itself.

Will I be able to find out the results of the project?

A summary of the project findings will be available to you to read at the conclusion of the study if you wish. You are able to view, read and comment on any data collection, themes or analysis made at any point during the research project.

I want to participate! How do I sign up?

If you would like to participate in this research, please read the 'Consent form' below, fill in your details and email to meredith.kelly@otago.ac.nz . Once received I will be in contact to discuss going forward.

Who do I contact if I have questions about the project?
You are able to contact me at any time.
Meredith Kelly
Phone: 03 2116809
meredith.kelly@otago.ac.nz
tonya.rooney@acu.edu.au

What if I have a complaint or any concerns?
This study has been reviewed and received ethical clearance through the Human Research Ethics Committee, Australian Catholic University. The ACU ethics approval number for the project is **2020-235**. If you have any questions regarding this study or would like additional information to assist you in reading a decision about participation, please contact:

Meredith Kelly
(03) 2116809
meredith.kelly@otago.ac.nz.

Tonya Rooney (Principal Supervisor)
tonya.rooney@acu.edu.au
Any complaint or concern will be treated in confidence and fully investigated. You will be informed of the outcome.
The study has been reviewed by the Human Research Ethics Committee at Australian Catholic University (review number **2020-235**). If you have any complaints or concerns about the conduct of the project, you may write to the Manager of the Human Research Ethics and Integrity Committee care of the Office of the Deputy Vice Chancellor (Research).

Manager, Ethics and Integrity
c/o Office of the Deputy Vice Chancellor (Research)
Australian Catholic University
North Sydney Campus
PO Box 968
NORTH SYDNEY, NSW 2059
Ph.: 02 9739 2519
Fax: 02 9739 2870
Email: resethics.manager@acu.edu.au

PROJECT TITLE: "Teacher perspectives on children's thinking and working theories"
APPLICATION NUMBER: (2020-235)
PRINCIPAL INVESTIGATOR: Dr Tonya Rooney
STUDENT RESEARCHER: Meredith Kelly

Participant Signed Consent

I ..... *(the participant)* have read (*or, where appropriate, have had read to me)* and understood the information provided in the letter to participants. Any questions I have asked have been answered to my satisfaction.

- I agree to participate in this research project anticipated to take approximately 7 months.
- I agree to any related discussions and meetings conducted as part of the research project being digitally recorded.
- I give consent to an iPad being used to record discussions in meetings held at the kindergarten. I understand the recordings will only be stored for the time it takes to have the data written up. Once there is a written version of recordings the recordings themselves will be deleted.
- I understand that if I decide to withdraw from the research study, I have the right to ask for my contribution to the data collection to be removed also.
- I realise I can have access to any data materials at any time and that I can withdraw my consent at any time (without adverse consequences).
- I agree that research data collected for the study may be published or may be provided to other researchers in a non-identifiable form.

NAME OF PARTICIPANT:
SIGNATURE: .....
DATE: .....
SIGNATURE OF PRINCIPAL INVESTIGATOR (or SUPERVISOR):
DATE: …….
SIGNATURE OF STUDENT RESEARCHER:
DATE: .....…….

Appendix G - Notes/material from professional learning (Phase 2)

Working Theories and Schema Learning Theory

Professional Opportunity

From our last meeting….

- We discussed your thinking of interpreting and making sense of children learning….
- Have you had any new thinking/thoughts around the ways in which you think about children's learning?

Readings…. Hedges (2015), Meade, (1995), Kelly (2016)

Working Theories and Schema Learning

Working theories – Social and socio cultural origins – Vygotsky
Discuss

Schema – cognitive constructivist origins – Piaget
Discuss

Te Whāriki – Valued Learning

- Working theories and learning dispositions are valued as equally important (2017)
- "Working theories are the evolving ideas and understandings that children develop as they use their existing knowledge to try and make sense of new experiences" (p. 23)
- Examples?

Working theories and tamariki…

- Working theories are theories about themselves, people, places and things in their lives…. The world, skills, strategies, attitudes and expectations…
- They learn WT through observation, listening, doing, participating, discussing, problem solving and exploring (dispositions)
- They develop in complexity
- WT can be challenged, provoked and new WT developed

Hedges, (2015)

Working theories and dispositions…??

- Dispositions are widely used in ECE however WT are generally not
- WT can reflect children's ongoing, deep interests….
- 'working' theories means they are tentative and speculative ideas…modified and changed….ongoing inquiries, … ways to express, explore, edit, connect and extend thinking….
- However many examples are based on what children say rather than what the 'do'…

Hedges, (2015)

Working theories and tamariki…

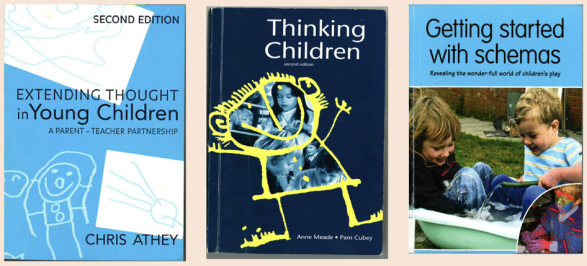
- Working theories are theories about themselves, people, places and things in their lives…. The world, skills, strategies, attitudes and expectations…
- They learn WT through observation, listening, doing, participating, discussing, problem solving and exploring (dispositions)
- They develop in complexity
- WT can be challenged, provoked and new WT developed

Hedges, (2015)

"Children's inquiry acts provide a window to their thinking, allowing us to glimpse what they make sense of and how they are doing it, how they understand and how they use others to help them"

(Lindfors, 1999, p. 16, cited in Hedges, 2015, p.47).

Schema Learning Theory



Schema and Working Theories

- Piagets 'schema' - children develop cognitive structures, frameworks or patterns of thought which change over time and through experience
- Schema and working theories? Understandings of what is 'known', what is true?
- Ways of thinking they take into new situations

Schema

- Can be seen as common threads or patterns of action i.e. through drawing, painting, construction etc actions repeated to suggest children are trying to 'fit' new ideas into existing ones…(Meade, 1995)
- Children are 'fitting' not 'flitting'
- Children 'come to know' through play (cant be taught)
- Schema can be linked to thinking about learning areas, ie. Maths and science

Competent Children Research Project

- Extended on Piaget's idea of 'children working with structures of thought'

Project identified patterns such as:

Static or action schema: lines, curves, dynamic vertical or horizontal, rotation, envelopment, containment, transformation, transportation, connection, trajectory..

Meade (2015)

Schema Learning Theory

Meade & Cubey's (2008) identified schemas:

- Transporting, transforming, trajectory, rotation, enclosure, envelopment, connecting and disconnecting
- Handouts
- Are there limitations of 'labelling' particular schema?'
- https://www.youtube.com/watch?v=SDIUA8ZzHUE

Schema Learning Theory

"Through her research, she (Athey, 2007) grouped common threads of children's play and investigation under schematic labels such as rotation, containment, enclosure, transportation, envelopment, transformation, connection and disconnection, trajectory, and so on. Each of these schema indicates particular attention to a repeated action; that is, enclosure and envelopment might see a child constantly covering themselves, covering others, or being inside small spaces" (Kelly, 2016, p.27)

Schema Progressions (Meade, 1995, Athey, 2007)

Motor, symbolic representation, functional dependency and thought (Athey, 2007)

Motor - playing with an idea

Symbolic representation – children play out understandings that reflect their own experiences i.e. playing with a truck after having a ride in a truck

Functional dependency – extends the idea or pushes its limits

Thought (abstract) – can discuss it with no equipment or materials

Responding to Schema and Working Theories?

- The language of the schema is essential for the development of 'thought' (Meade & Cubey, 2008)
- Careful observation and connections over time and environment
- Make 'thinking' more explicit in assessment, valuing the cognitive process are valuable learning

Responding to Schema and Working Theories?

- Using socio-cultural approaches WITH the schema, questioning, participation, environment
- Encourage whanau to be involved in exploring child's thinking

Responding to Schemas

- https://www.youtube.com/watch?v=SnpzRurXc4Q
- Providing an environment rich in opportunities for schemas development
- 'Nourish' the schema; can schema be utlised to extend children's working theories?

Schema Learning Theory

"Schema learning theory offers insights into children's thinking which is not always explicit within current sociocultural assessment practices. Without specific attention and value placed on how and why children think the way they do, particular schema and working theories could be left unnoticed. As Athey (1990) advocates, schemas are used to specifically highlight children's thinking and may be the future strategy needed to fill the "thinking" gap in the current sociocultural assessment model" (Kelly, 2016, p. 30)