Subject content knowledge in early childhood curriculum and pedagogy

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ABSTRACT

In primary and secondary teaching, subject knowledge is deemed a critical aspect of teachers' knowledge base and curricula documents. However, a common feature of early childhood education is an underemphasis of the subject content knowledge of teachers and children. Teacher beliefs have been established as perhaps the most important determinant of quality teaching and learning interactions and teacher professional growth (Kagan, 1992a). Underpinned by contemporary sociocultural theory and an interpretivist methodology, this thesis explores the beliefs of teachers, parents and four-year-old children in one public kindergarten about subject knowledge, and the influence of these beliefs on the curriculum and pedagogy children experience. The beliefs held are explored through the mechanism of a shared social and cultural event, an excursion, as a framework for the study.

Teachers and parents expressed clear beliefs about the importance of subject content knowledge. Children's beliefs were also revealed implicitly through their interactions, and supported the adults' views. However, subject knowledge was underemphasised in the majority of teaching interactions unrelated to the excursion and in curriculum documentation within the kindergarten. Yet the evidence supports that children's thirst for subject content knowledge was a motivational linchpin in their socially-constructed and inquiry-based learning experiences. The meaningful responses of the teachers were crucial to positive learning outcomes and were based on their own professional knowledge of subject content, pedagogical approaches consistent with early childhood philosophy, and the children as learners.

The study's findings are analysed from two perspectives. Firstly, using four themes as a conceptual framework, categories of teacher knowledge are explored for their construct validity in early childhood education. Secondly, the findings of the study are interpreted in relation to sociocultural theory. The conclusion argues for enhanced awareness of subject knowledge in early childhood learning, teaching and curriculum in Aotearoa/New Zealand. While maintaining a play-based and integrated philosophy, the subject knowledge of both teachers and children requires more explicit attention. Teachers' subject knowledge is crucial for extending children's learning. There is potential for inquiry and reflection on beliefs and practices with regard to subject knowledge within sociocultural notions of learning communities.

ACKNOWLEDGEMENTS

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Chapter One
INTRODUCTION

Beliefs, curriculum and pedagogy

Identifying what knowledge is of most importance is a fundamental epistemological task. The present study focused on one aspect of teachers' professional knowledge: subject knowledge. Subject knowledge is a form of knowledge that delivers educational, social and economic benefits for individuals and societies (Bempechat & Drago-Severson, 1999). Research on beliefs related to subject knowledge in early childhood curriculum and pedagogy is sparse. As a result of introducing a new National Curriculum based on subjects, research has been conducted in the United Kingdom (Aubrey, 1997; Maynard, 1996; Sanders, 1996), and more recently in Greece (Kallery & Psillos, 2001).

The present study researched beliefs about subject knowledge held by children, teachers and parents in one early childhood setting in Aotearoa/New Zealand, and the influence of these beliefs on the curriculum and pedagogy children experienced. The beliefs held are explored through the mechanism of a shared social and cultural event, an excursion, as a framework for the study. An excursion is perceived as a means of enriching the curriculum to extend children's learning, through providing first-hand experience of people and places in the community (Van Scoy, 1995).

The impact of teacher beliefs on the curriculum and pedagogy provided for learners has been a focus of research during the last ten years (Fang, 1996; Kagan, 1992a; Pajares, 1992; Richardson, 1996), including in early childhood education (McMullen, 1999; Smith & Croom, 2000; Stipek & Byler, 1997). As a form of personal knowledge, teacher beliefs are likely to determine the quality of teaching and learning in terms of what (curriculum content) and how (pedagogy) teachers teach, and may also be the clearest measure of teachers' personal growth (Kagan, 1992a).

A central commitment to partnerships with parents exists within early childhood education philosophy. Parents and families/whānau are an integral part of the early childhood community. Research previously conducted of teachers' and parents' views of early childhood education (Foot, Howe, Cheyne, Terras & Rattray 2000; Sharpe,

1991; Stipek, Milburn, Clements & Daniels, 1992) commonly revealed conflicting perspectives. Therefore it was appropriate that parents' beliefs about subject knowledge were sought alongside those of teachers. Another recent research development is to include children as direct participants (Alderson, 2000; Cullen, 1998a; Sheridan & Pramling Samuelsson, 2001). Four-year-old children's participation in this research assisted validation and veracity of research findings and gave children a voice. Thus multiple perspectives were obtained.

Challenges for early childhood education

The "early years" is seen as catering for children from birth to eight years, traversing the early childhood and junior primary sectors in Aotearoa/New Zealand. Early childhood is a term describing not only the age of children served, but also the philosophy, pedagogy and curriculum ideologies of the sector. Constructs such as child-centred, child-initiated, holism, developmentally appropriate practice, integrated curriculum and play have dominated western early childhood teaching (Chung & Walsh, 2000; Curtis, 1998; Fleer, 2001; McMullen, 1999). Such constructs appear to have been used to exclude specific teaching and learning of subject knowledge and have left teachers without clear guidelines for content selection in curriculum.

While early childhood education is characterised by diversity in its curricula, a common feature of curricula documents is a neglect or underemphasis of the subject content knowledge of both teachers and children (MacNaughton, 1999). Accordingly, the curriculum document for early childhood in Aotearoa/New Zealand, *Te Whāriki* (Ministry of Education, 1996), does not emphasise subjects. Unless challenges to beliefs and practices that have dominated early childhood education occur, potential limits are placed on learning and teaching interactions between teachers and children (Anning, 1998; Cannella, 1997; Fleer, 2001).

The present study is underpinned by sociocultural theory. Sociocultural theory is emphasised in views of knowledge, curriculum and pedagogy examined. From this perspective, knowledge is seen as socially-constructed, with human beings motivated to actively construct and reconstruct knowledge in relationships and interactions with others, intent on meaning making (Dahlberg, Moss & Pence, 1999) and negotiating meaning (Wenger, 1998). Children are viewed as capable and competent learners, with a wealth of

prior knowledge to contribute to current meaningful experiences. With children's learning and development defined as a "process of socialisation into the existing system of meanings in a culture, the goal for research becomes one of understanding how children attain those meanings" (Göncü, 1999, p. 12).

Overview of thesis

The aims of this study were to:

1. Explore beliefs about subject knowledge held by teachers, parents and children involved in early childhood education.
2. Identify links between beliefs and curriculum and pedagogy in relation to subject knowledge.

In chapter two the theoretical frameworks, discourses and literature contributing to this study are reviewed. The first is views of knowledge, including models of teacher knowledge. The second is that of beliefs and their impact on teaching practice. Thirdly, the philosophical underpinnings of early childhood curriculum and pedagogy are discussed. In particular, sociocultural theory is explored in terms of knowledge, pedagogy and curriculum.

Chapter three describes the interpretivist methodology, case study design, data collection and analysis procedures, the participants and ethical considerations, and issues of validity and reliability relevant to the present study. Chapter four describes the results of the study, using four themes as a conceptual framework. These themes are adapted from existing models of teacher knowledge (Grossman, 1990; Shulman, 1986; Wilson, Shulman & Richert, 1987).

In chapter five, the findings of the study are further interpreted in relation to sociocultural theory. Key concepts of socially-constructed learning and the applicability of concepts of learning communities are explored (Rogoff, Matusov & White, 1996; Wells, 2001a; Wenger, 1998). Finally, in chapter six, the kind of knowledge that should be included in a sociocultural curriculum, the implications of the research findings, and recommendations for teaching practice, educational policy, teacher education and professional development in Aotearoa/New Zealand are raised. A way forward and future research directions are suggested.

Chapter Two
LITERATURE REVIEW

Knowles and Cole (1998) highlight the impact of beliefs, knowledge and research on teaching: "Teaching is a 'heart-filled, mind-informed, research-driven commitment'" (p. 22, cited in Samaras, 2000). The present study draws on a range of concepts, theories and models in relation to beliefs and knowledge about teaching. In this chapter, perspectives on knowledge are first described. Categories and models of teachers' professional knowledge are reviewed, in particular, literature related to subject content knowledge. Insufficient research has investigated professional knowledge in early childhood teaching, therefore current understanding needs to be derived from research conducted in other education sectors and applied to this study. The theoretical assumptions of early childhood teacher preparation are then questioned. Research conducted on the knowledge base that children bring to learning experiences is also summarised. Literature about beliefs and previous studies of teachers', parents' and children's beliefs about teaching and learning are described. Finally, discussion of early childhood curriculum and pedagogy occurs, focusing on consideration of subject content and the learning that an excursion might promote.

Concerns, contrasts and contradictions become apparent in this discussion of the literature. These are drawn together to provide the research focus of the present study. It should be noted that the literature reflects western cultural perspectives, as the literature available is largely from the United Kingdom, the United States of America, Canada, Australia and New Zealand. Evidence from cross-cultural studies suggests that other cultures' views of education and teachers' knowledge and roles are likely to be different (Rogoff, 1990; Woodhead, 2000).

Perspectives on knowledge

Changing perspectives of knowledge have resulted in altered educational practices. According to Case (1996), the first views of knowledge were empiricist, that is, based on observation of learners, and led to behavioural teaching and learning approaches. These views were questioned for disregarding complex inner processes responsible for human behaviour and learning. Case describes a second perspective of knowledge as rationalist, seeing the ability to learn as innate and acted on by outside conditions. This view

proposed that children's development led learning. The term "cognitive-constructivist" emphasised the view that learning was an active and individual undertaking, and considered the roles of problem solving and learning motivation. Thus, cognitive theories of learning developed, emphasising Piaget's efforts to describe these cognitive structures children were seen as being born with (see Donaldson, Grieve, & Pratt, 1983). Moreover, normative, sequenced and predictable descriptions of development made application to educational practice easy to identify, interpret and plan for.

Cole and Wertsch (1996) claim that although Piaget acknowledged the role of social experience, he saw learning primarily as resulting from children's individual exploration of their environment. Accordingly, early childhood educational practice focused on providing a stimulating environment that engaged children in self-initiated discovery learning. Piaget's assumptions that knowledge is coherent rather than subject-specific and that knowledge is modified internally have been challenged by recent research. Newer learning theories acknowledge both subject-specific learning and the influence of social and contextual factors on learning (Cole & Wertsch, 1996).

Sociocultural perspectives

A third perspective of knowledge described by Case (1996) is knowledge founded on the social values and history of a culture, and the beliefs that underpin these. A sociocultural perspective conceptualises culture as a dynamic system of meaning, with values, goals and practices to promote education (Göncü & Katsarou, 2000). Subject knowledge is a form of culturally-valued knowledge that delivers educational, social and economic benefits for individuals and societies (Bempechat & Drago-Severson, 1999).

Underlying beliefs and theories that influence culturally-valued knowledge have important implications for approaches to children's education. Vygotsky's (1978, 1986) sociocultural theories are consistent with Dewey's beliefs about education. Dewey (1938) argued that a traditional approach to education, based on subjects, avoided what he saw as a requirement for a teacher to be knowledgeable about "community, physical, historical, economic, (and) occupational" (p. 40) conditions and contexts. It should be noted that Vygotsky did not study children under the age of seven years and his ideas and theories have been extrapolated for their usefulness to early childhood education (see Berk & Winsler, 1995).

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Social interactions with more knowledgeable others extended children's capabilities (Vygotsky, 1978, 1986), hence the term "socially-constructed learning". Further development of Vygotsky's views have led to discussion of the role of cultural tools in learning, new pedagogical approaches and the view that knowledge is shared across a culture rather than belonging to individuals (Rogoff, 1990, 1998; Valsiner, 1993). Sociocultural perspectives view learning as socially and culturally situated and mediated. Learning is concerned with meaning-making (Dahlberg, Moss & Pence, 1999) and inquiry processes, through active participation in learning experiences that enable learners to participate increasingly effectively in their cultural communities. The construction of knowledge is an outcome of these actions. In considering subject knowledge, educational practice may then have a case for more content-focused learning.

A synthesis

Each of these views (empiricist, rationalist and sociocultural) has been developed from the insights of earlier views. Various learning theories and the contextual factors that impact on learning have contributed to developing and modifying recent views of knowledge. In terms of educational practice, more emphasis has been placed recently on the relationships and interactions between learners and teachers. This leads to a current description of knowledge as "human construction, created by diverse groups in diverse forms dependent on context and circumstances" (Cannella, 1997, p. 4). Knowledge seen as desirable relates to the overall values held by a culture at a particular time. This influences the content of education (New, 1999). In turn, this ought to influence appropriate teacher knowledge.

Teachers' knowledge base

Teachers' professional knowledge concerns what is to be taught (content knowledge), and the knowledge required to teach it (pedagogical knowledge). Teaching practice is complex. A professional teacher integrates knowledge with moral integrity (Codd, 1997) and interprets knowledge through beliefs (Kagan, 1992a).

Categories and models of teachers' knowledge

Much early research on teachers' generic pedagogical knowledge in the primary and secondary sectors relied on quantitative data that tried to find relationships between pedagogical knowledge, teacher effectiveness and students' achievement (Brandt, 1992). Emphasis on teacher performance then changed to teacher capability. Research efforts

began to identify and describe the knowledge base of teaching by studying teachers' cognitive processes: their thoughts, judgements, decisions and plans (Grossman, Wilson & Shulman, 1989). Research based on case studies informed the field of teaching about underlying knowledge and beliefs that influenced teachers' actions.

Carr and Kemmis (1983) delineated seven categories of teacher knowledge. These are: professional knowledge of pedagogy and curriculum; educational theory; contextual knowledge of individual students, the class, community and culture; skill knowledge of effective teaching strategies; social and moral theories and philosophies; common-sense knowledge and the folk wisdom of teachers. The focus of this thesis is the first category of professional knowledge of pedagogy and curriculum. However, this category is undoubtedly impacted on in teaching practice by aspects of other categories.

Shulman (1986), and Wilson, Shulman and Richert (1987), also defined seven categories of teacher knowledge: knowledge of content, knowledge of pedagogy, knowledge of curriculum, knowledge of learners and learning, knowledge of contexts of schooling, pedagogical content knowledge, and knowledge of educational philosophies, goals and objectives. From research into secondary teaching that followed on from Shulman's work, Grossman (1990) identified four general areas of teacher knowledge associated with professional knowledge and teacher education. These are general pedagogical knowledge, subject knowledge, pedagogical content knowledge and knowledge of context. General pedagogical knowledge includes the knowledge, beliefs and skills related to teaching, learning and learners and general principles of instruction. Subject knowledge is defined as teachers' knowledge of content, that is, the facts and concepts within the field and the relationships among them. Pedagogical content knowledge refers to knowledge specific to teaching particular subject content. Knowledge of context means that teachers need to apply their content and pedagogical knowledge to specific settings and students.

Subject content knowledge

Shulman (1986) was the first to raise that research on teacher knowledge had not accounted for subject knowledge. Subject content knowledge relates to teachers' conceptual knowledge of the discipline of their teaching subjects, for example, science, mathematics, literature or music. Other aspects of subject content knowledge include knowledge of the paradigms within the field, processes of inquiry and how to evaluate claims of new knowledge made by experts of the discipline. Further research based on

first year primary teachers' experiences of induction and mentoring, cemented the view that subject matter knowledge is crucial to successful teaching and both teachers' and students' deeper understanding of content (Feiman-Nemser & Parker, 1990).

Pedagogical content knowledge has three components according to Shulman (1986): knowledge of a subject, knowledge of children's existing knowledge and beliefs about the subject, and knowledge of effective ways to represent this subject to children. Differentiating subject content and pedagogical content knowledge applies to the discipline of teaching a distinction commonly referred to by the terms "declarative" and "procedural". Declarative knowledge refers to the facts and concepts underlying a subject or discipline; procedural knowledge to the procedures, processes and strategies associated with that knowledge and how it is taught (Sternberg, 1998).

Investigations into teachers' subject knowledge and understandings have contributed to understanding an important conceptual distinction between subject knowledge itself and the subject knowledge utilised in teaching. Wilson, Shulman and Richert (1987) demonstrated that knowledge is not merely factual, but includes teachers' beliefs and understandings in relation to the subject. When the context of the teaching is taken into account the importance of combining subject knowledge and pedagogical knowledge becomes evident. For example, the acquisition of language, literacy and higher cognitive thinking processes alters the way children and adults learn. Therefore pedagogical strategies ought to be modified to be both learner and contextually appropriate.

Both subject content knowledge and pedagogical content knowledge continue to be developed in practice. Teachers cannot be expected to know everything. However, Grossman, Wilson and Shulman (1989) found that lack of subject content knowledge led to secondary teachers using strategies such as direct instruction or heavy reliance on textbooks that avoided teachers dealing with deeper conceptual understandings. Such strategies imply that a teacher may also not be able to evaluate critically the content being presented to students. The latter could also be true of early childhood teaching if teachers lack awareness of gaps in their subject content knowledge and conceptual understanding.

The knowledge base of early childhood teachers

The knowledge base of early childhood teachers, from the western perspective, has been heavily influenced by constructs of childhood based on philosophical views, and applied child development with roots in developmental psychology (Cannella, 1997). Programmes in early childhood education settings have often been based on a "developmental play curriculum" following Piagetian theories of children's cognition. A developmental approach was designed to foster holistic development of the child's physical, affective and cognitive developmental domains. An appropriate educational environment encouraged exploration, manipulation and symbolic play during children's self-chosen activities.

The influential model known as "developmentally appropriate practice" (Bredekamp, 1987; Bredekamp & Copple, 1997) became the basis of, and justification for, what were seen as appropriate programmes for young children. Teachers were provided with age and stage-appropriate guidelines for working with children during play to encourage children's physical, cognitive and affective development. As a result, studies of child development and play have been seen as the basis of teacher preparation for working in early childhood education.

Challenging the developmental approach

The strengths of Piaget's theory are his focus on children's thinking and self-initiated active involvement in learning (Cole & Wertsch, 1996). Play is the way children most often voluntarily involve themselves in learning. Nevertheless, whether or not child development knowledge and programmes based on Piagetian views of cognition are a sufficient theoretical base for early childhood education programmes and pedagogy has been raised as an issue (Fleer, 1995; Stott & Bowman, 1996).

It could be argued that the view of the "universal" child as an individual progressing through expected, or normative, stages of learning and development, ignores the influence of social, cultural, political and economic contexts and the complexities of development (Dahlberg et al., 1999). Adults holding this view disempower children in both educational and research activities, as adults largely make decisions and inferences on behalf of children. Children's choice of play experiences is determined by adults who create the environment for play and make decisions about when and for how long a child can participate in play (Cannella, 1997).

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A developmental perspective applied to the early childhood curriculum adopts a "human becomings" approach to children (Woodhead, 2000), as experiences provided are designed to move children on through typical developmental stages. This approach emphasises a stimulating educational environment few would disagree with. However, developmental theory does not make explicit the links to processes of teaching and learning that teachers and children can engage in. It promotes teachers following rather than leading children's conceptual thinking. The pedagogy is invisible and informal, and difficult to justify to parents, authorities and other education sectors. Accordingly, the developmental discourse of early childhood curriculum and pedagogy has been called into question (Cannella, 1997; Lubeck, 1998).

A sociocultural perspective

In contrast, a sociocultural perspective within early childhood education focuses on "human beings" (Woodhead, 2000). This view considers children as powerful and competent, and growing in capability through participation in educational and socially and culturally valued activities. The image of the child is that of being "rich in potential, strong, powerful, competent and, most of all, connected to adults and other children" (Malaguzzi, 1993, p. 10). From this perspective, teachers have an active and more central role to play in children's learning. Consequently, the nature of the knowledge base that teachers bring to interactions may require more emphasis and prominence to justify professional actions.

What constitutes capability or competence reflects the values of a culture. Some educational experiences are believed to be more valuable than others, because of their links to future social and economic advantages (Bempechat & Drago-Severson, 1999; Grieshaber & Ashby, 1997). Subject knowledge is commonly one such culturally-valued endpoint of learning. As an entity itself, subject content knowledge is also culturally-determined and contextually-bound. In this thesis, becoming a capable and confident learner, competent in constructing subject knowledge, is perceived as a consequence of social interactions, and interpretations and re-interpretations of participating in culturally and educationally valued experiences.

In addition, sociocultural approaches separate conceptually child development knowledge from pedagogical knowledge in early childhood education (Dockett & Fleer, 1999). Child development knowledge can assist teachers to describe and interpret observations of children as learners as part of their professional judgements. However child development theory ought to be embedded in social and cultural contexts (Woodhead, 2000). Pedagogical knowledge enables teachers to choose teaching techniques to extend children's learning and knowledge, taking into account teachers' knowledge of the children and the context of each teaching and learning interaction.

A sociocultural perspective promotes the view that learning leads development. Recent approaches to the teacher's role in facilitating children's learning have been influenced by the view that learning is social in origin and a process of active construction. Much knowledge is gained in a social context as a result of interpersonal interactions (Rogoff, 1990, 1998; Valsiner, 1993; Vygotsky, 1978, 1986). Through meaning-making and dialogue with others, and the mediation of cultural tools (e.g., language, books, symbols), the individual makes sense of learning and internalises it in thought. In particular, language allows both knowledge construction and the appropriation of complex ideas and cognitive processes. Sociocultural theories have brought to prominence the importance of teaching and learning relationships and interactions. In socially-constructed learning, teaching can be viewed as an active, complex and contextualised process in which teachers' knowledge provides the means for interpreting and responding to teaching and learning interactions that promote conceptual learning and change.

Two significant sociocultural concepts in relation to such teaching are the zone of proximal development and intersubjectivity. The zone of proximal development (ZPD) is a concept defined as the distance between a child's current level of ability as determined by independent problem-solving and a higher level of potential ability achieved in collaboration with more capable adults or peers (Vygotsky, 1978). The ZPD provides a framework for understanding how children's knowledge can be supported during learning and teaching interactions. Through the assistance of more knowledgeable adults or peers, less capable participants can perform beyond their competence than when acting alone.

The importance of recognising children's prior knowledge is crucial to the authentic meaning-making inherent in intersubjectivity. Intersubjectivity can be defined as mutual or shared understanding; a sharing of purpose or focus among individuals. This process involves cognitive, social and emotional interchange. Teachers need to understand children's experiences, knowledge and feelings. Ratner and Stettner (1991) noted that studies often researched cognition and emotion separately, and that this has limited understanding and interpretation of research. This is a potential criticism of Vygotsky's work also. Also relevant to this present study, Tudge (1992) noted that shared events or tools between participants appear to enhance intersubjectivity. An excursion undertaken by an early childhood setting is an example of such a shared event. Through the shared focus of an excursion, cognitive, social and emotional dialogue and exchanges occur between adults and children.

Contemporary views of learning in early childhood education

Contemporary perspectives of learning in early childhood see learning as a collaborative undertaking in experiences of shared interest. *Te Whāriki*, the New Zealand early childhood curriculum, views learning in early childhood settings as occurring through responsive and reciprocal relationships with people, places and things. An excursion participated in by teachers, parents and children is likely to involve all three.

Learning communities in sociocultural theory

A focus on community within sociocultural theory has led to terms such as "community of learners" (Rogoff, Matusov & White, 1996), "communities of practice" (Wenger, 1998) and "community of inquiry" (Wells, 2001a). Rogoff et al.'s (1996) term emphasises that learning is commonly a collaborative participation in shared experiences. It highlights the intersubjectivity required for meaningful learning and teaching. Wenger's (1998) notion places learning within the contexts of social experience that are an integral part of daily human life. Four key elements are present in this concept of learning: meaning, practice, community and identity. These are "deeply interconnected and mutually defining" (p. 5). The outcome is constructing an identity and sense of belonging in relation to the values and goals of the communities. Wells' (2001a) concept suggests teachers and learners explore together issues to which there are no predetermined answers or outcomes. The approach has been developed on the belief that inquiry is relevant to all learning situations across education sectors.

Children's communities of practice include the home, early childhood service and other settings they participate in. For example, children may attend music, dancing or gymnastics classes. These settings focus on the acquisition of discipline-specific knowledge and skill, often through formal teaching approaches. They present specialist knowledge that differs from the broader knowledge acquired in home and centre communities of practice. These communities of practice induct new members of the community into established knowledge and practice, often with an apprenticeship approach.

Learning within communities includes planned and spontaneous experiences, with teachers often sharing the learning with children. For early childhood teachers, teaching often takes advantage of the "unreturning moment" (Meade, 1997, p. 36), more commonly called a teachable moment. A sociocultural approach to pedagogy and curriculum, and consideration of what is to be taught, including content, in early childhood education ought to first take into account children's existing knowledge. The following section discusses studies involving research that has investigated the knowledge children bring to learning and teaching interactions.

Children's knowledge

"Any subject can be taught effectively in some intellectually honest form to any child at any stage of development" (Bruner, 1960, p. 33). Bruner's claim is not that anyone can learn anything at any age. By including the qualifier "in some intellectually honest form", he proposes that some discipline-related subject content can be taught meaningfully, if children can relate it to their existing knowledge and it is presented in a relevant way. This is consistent with Dewey's (1938) contention that no subject has educational value unless the capacity of the learner is taken into account. Dewey argued that education should be based on the experiences of the learner and lead to subject knowledge.

Children's prior knowledge has been researched recently (Cullen & Allsop, 1999; Dilkes, 1998; Wellman & Gelman, 1992, 1998). Supporting earlier critiques of Piagetian theory (Donaldson, Grieve & Pratt, 1983), these studies provide evidence that children are more capable than previously promoted by the developmental discourse prominent in early

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childhood. Through understanding the child's prior knowledge and interests and the child's home background and funds of knowledge (Moll, 2000; Moll, Amanti, Neff, & Gonzalez, 1992), teachers and children can construct and extend children's knowledge. This links knowledge research with sociocultural theory. Moll et al. (1992) propose that teachers build on knowledge and practice occurring in children's homes. They define funds of knowledge as the bodies of knowledge that underlie household functioning, development and wellbeing. Examples include economics, such as budgeting, accounting and loans; repair, such as household appliances, fences and cars; and arts, such as music, painting and sculpture (Moll, 2000). This concept has been further interpreted recently to include specialist knowledge children learn through their parents' occupations and interests (Carr, 2001a).

Children's prior subject knowledge

The following studies have researched the prior knowledge that children bring to a learning situation. Cullen and Allsop (1999) observed three and four-year-old children in spontaneous outdoor play. They noted that children brought a range of prior domain (i.e., coherent subject) knowledge and experience to their play, such as how to make concrete, the ability to tie knots, and types of insects and weapons. Dilkes (1998) conducted a study of four and five-year-old children's spontaneous and improvised music experiences. She used observations, video recordings of music sessions and audiotape recordings. The audiotapes recorded children's interviews with teachers at the centre about their musical experiences. Children were encouraged to recall and describe their experiences. This research also demonstrated that children bring much knowledge of sounds and songs to their learning in an early childhood setting.

Recent research on children's prior knowledge supports the notion of children moving from novice to expert in different domain areas (Wellman & Gelman, 1992, 1998). Describing prior knowledge as "foundational" to new learning, Wellman and Gelman's research emphasises the importance of constructing new knowledge based on existing knowledge. Experienced or expert learners bring applicable and effective knowledge to new learning situations. For example, Toyama, Lee and Muto (1997) observed and recorded children's prior and subsequently learned knowledge of biological concepts related to procedures for animal care. Further, they suggested several factors that may be related to children's conceptual understanding. These included children's voluntary

participation in learning experiences of interest to them and time for children to reflect on learning both during and after participation in experiences. Pramling (1996) analysed teacher-child dialogues in order to seek participants' perceptions and understanding of phenomena. Her research supports that meaningful learning for children needs to begin from their prior understanding of the world. In constructing new understandings, children, as experienced learners, bring applicable and relevant knowledge and experience to learning situations. Pramling also claims that programmes developed from children's interests and experiences assist children's cognitive and metacognitive development.

The following studies highlight the involvement of families in children's learning alongside findings of children's capabilities. Fleer (1996) considered the relationship between centre and families' experiences of children's science education. Findings indicated that parents' awareness of what children were learning supported further discussions at home and that children asked scientific questions more frequently at home. Fleer (1997) studied the experiences of technology in the home on three to five-year-old children's knowledge. The teachers of these children were unaware of the range and depth of children's understanding of technology. Aubrey (1997) investigated the mathematical knowledge five-year-old children had before starting school, also concluding that teachers were unaware of the richness of such prior knowledge.

The research cited provides evidence of the broad prior knowledge children bring to new experiences and learning. These studies use different terminology, for example, "foundational", "domain" and "funds of knowledge". This suggests that young children's prior knowledge and styles of learning and thinking take on certain qualities. The personal qualities of children's knowledge are based on the unique family and community experiences that contribute to their foundational knowledge, further encapsulated in the concept of funds of knowledge. In addition, young children are likely to have a wide range of interests, but relatively limited experience and cognitive and metacognitive abilities. Because of these factors, the qualities of children's knowledge are unlikely to be the same as the conventional sense of subject knowledge as domain or discipline-based. However, the term "subject knowledge" is adopted in this study with regard to children's knowledge to be consistent with the literature reviewed.

These studies also support an approach to research with children that incorporates interviews and participant observation (including spontaneous conversations with children) in the naturalistic setting of children's early experiences. This approach promotes authenticity and veracity in the research findings. Yet few of these studies interviewed children in groups, focusing instead on dyadic interactions and individual contributions. A socially-constructed view of learning would suggest that peer group interviews and interactions would be appropriate to research knowledge and beliefs in the present study (Cullen, 1998a; Singer, 1996).

This section of the review has considered perspectives of knowledge and their application to educational practice. It has also outlined models of teacher knowledge, emphasising subject content knowledge. The knowledge base of early childhood teachers has been described and the assumptions on which this is based critiqued. It has been argued that a sociocultural view of teaching requires greater emphasis on subject knowledge, cultural dimensions and values, and teaching relationships, alongside knowledge of child development. Recent research on children's knowledge has been summarised to support the view that children bring a range of prior subject knowledge to new learning experiences.

Beliefs in teaching and learning

The following section reviews the literature on beliefs in teaching. The nature of beliefs, their origins and tenacity are described. While there is a great deal of literature about knowledge, values, beliefs, attitudes and ideas, there is little conceptual clarity between these terms. Writers tend to use them interchangeably to mean the same thing (e.g., see Harkness & Super, 1996; Maynard, 1996). Richardson (1996) provides a distinction between beliefs and attitudes, describing the study of attitudes as an affective component of social psychology and beliefs as belonging to cognitive psychology. Pajares (1992) asserts that terms such as attitudes, values, perceptions, personal epistemologies, practical knowledge, implicit theories and opinions are commonly beliefs "in disguise" (p. 309).

While knowledge and beliefs are interdependent, Pajares (1992) makes the following distinction between them. Knowledge is seen as a cognitive outcome of learning without the impact of an affective component. Beliefs have an affective and evaluative component that may function independently of the cognitive knowledge, that is new knowledge is only

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accepted if consistent with related beliefs about that knowledge. Attitudes and values are described by Pajares as substructures of beliefs, are viewed as less deep than beliefs and alterable through disconfirming experiences. These constructs, in turn, influence thought and action. Of particular relevance to the present research, Pajares highlights the importance of teachers' subject-specific knowledge and beliefs in relation to children's learning.

Beliefs, then, are likely to be more subjective than knowledge, held with varying degrees of conviction, and perhaps open to modification. Some beliefs may be central to teacher action, while others may be peripheral. Moreover, some beliefs may change as a result of experience, and even become knowledge. Kagan (1992a) suggests that "most of a teacher's professional knowledge can be regarded more accurately as belief" (p. 73). As a form of personal knowledge, Kagan considers teacher beliefs as likely to determine the quality of teaching and learning in terms of what (curriculum) and how (pedagogy) teachers teach, and also to be the clearest gauge of teachers' personal growth. "Pedagogy" as a term is commonly used interchangeably with "teaching", but also encompasses the "theories, beliefs, policies and controversies that inform and shape it" (Alexander, 2000, p. 540) and the processes of learning that occur within the pedagogical approach.

Early research on teaching focused on teacher behaviour and teaching practice, ignoring the thoughts and beliefs of teachers. Recently, beliefs as they underpin teacher decision-making have been researched (Pajares, 1992; Richardson, 1996; Stipek & Byler, 1997). However few longitudinal studies have researched teacher beliefs. Most research has been undertaken with student teachers (e.g., Smith, K., 1997; von Wright, 1997). These studies have concluded that teachers bring enduring beliefs to both teaching and teacher education. These beliefs are based on their life experiences, including the socialising experiences of their own education, and are frequently resistant to change (Richardson, 1996).

Bandura (1997) noted that beliefs mediate between knowledge and performance in both learning and teaching. Beliefs are personal, complex, likely to be self-fulfilling and not always internally consistent (Bennett, Wood & Rogers, 1997; Nespor, 1987). Teachers' values and beliefs also often act as a filter for new knowledge. Teaching practices are more commonly associated with attitudes and ideals than educational theory or research (Kagan, 1992a; Kennedy, 1997; Stipek & Byler, 1997). New knowledge is only put into

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practice when consistent with beliefs. Most significantly, beliefs are unlikely to change unless they are challenged (Kagan, 1992a; Pajares, 1992; Raths, 2001).

Brousseau, Book and Byers (1988) researched orientations to teaching of both student and practising teachers, using survey instruments and interpretation scales based on prior research. Two findings are potentially relevant to this study. Their findings confirm that beliefs are highly resistant to change and that as these mediate between thinking and practice, uncovering and examining beliefs is of paramount importance. They also found that the more experienced the teacher, the more likely they were to have positive views of learners. This thesis argues that a major criticism of Brousseau, Book and Byers' study, and others conducted around that time, is that it used a quantitative approach. A quantitative design alone is unlikely to elicit data congruent with the intrinsically meaningful nature of beliefs. Kontos and Wilcox-Herzog's (1997) more recent study in early childhood similarly relies primarily on a statistical analysis of teacher-child interactions to make its argument. While this provides forceful evidence with regard to the paucity of meaningful interactions with teachers from a child's viewpoint, a limitation is that beliefs about interactions and relationships held by teachers are not elicited by such studies. Qualitative studies could supplement and enhance the findings of quantitative studies.

Teachers', parents' and children's beliefs about children's learning may also be self-fulfilling or conflicting, particularly given that children commonly experience less power in adult-child relationships. Adults' beliefs about children affect the content and process of the education they receive (Woodrow, 1999) and ways they are researched (Woodhead & Faulkner, 2000). In order to increase respect for children's views about their learning, both public and professional thinking may require a shift towards a more realistic and informed view of young children's abilities (Alderson, 2000; Watson, R., 1996). Recent evidence of children's knowledge promotes children as "cognitively competent, intellectually active and socially engaged much earlier than previous theories allowed" (Watson, R., 1996, p. 158). This change in thinking may also involve teachers and parents examining their beliefs about specific aspects of education, and reflecting on the adequacy of their own knowledge base in order to support children's learning.

In the following section, literature about teachers', parents' and children's beliefs in early childhood education is reviewed to present a context for the present study. Teachers and parents have complex beliefs, values and attitudes about children, childrearing, learning and education, commonly based on their own experiences as children, learners and adults. Recently, children's perspectives of their educational experiences have also been researched.

Teacher beliefs

Teachers' knowledge, pedagogical skills, beliefs and values impact directly and indirectly on the curriculum offered to children (Bandura, 1997; Pajares, 1992). Nespor's (1987) study concluded that beliefs were more influential than knowledge in influencing primary teachers' educational decision-making. In a New Zealand study, Bell (1990) interviewed six early childhood teachers about their beliefs related to curriculum and teaching practice. These teachers' practice was revealed as based on personal beliefs and values rather than on theory learned during pre-service teacher education. For example, teachers organised early childhood educational environments based on their personal beliefs about the experiences most conducive to facilitating children's development and learning.

Teacher beliefs about developmentally appropriate practice

A focus of research on teacher beliefs in early childhood has related to the concept of developmentally appropriate practice (McMullen, 1999; Smith, K., 1997, Vartuli, 1999). This was defined earlier in this review as fostering holistic development in terms of developmental domains, in a learning environment that encourages exploration through child-initiated play. This construct continues to be promoted, most recently by Bredekamp and Copple (1997). Such support persists despite the criticisms cited earlier, and two further cautions relevant to the present study, that developmentally appropriate practice can limit teachers' planning and interactions with children and that it underemphasises children's subject content learning.

Vartuli (1999) used questionnaires and self-rating scales to ascertain if early years teachers' beliefs varied across the early childhood and junior primary sectors. She found that most qualified early childhood teachers had positive beliefs about developmentally appropriate practice. Primary teachers with early childhood qualifications were more likely to have positive attitudes towards developmentally appropriate practice and

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implement these in their teaching practice than those without early childhood content in their teacher preparation programme. Similarly, McMullen (1999) and K. Smith (1997) investigated the beliefs about developmentally appropriate practice of teachers (McMullen) and student teachers (Smith) across the early years, also utilising questionnaires and self-rating scales. Both reported that primary teachers who had early childhood studies in their teacher education expressed stronger beliefs in developmentally appropriate practice than those who had not.

The present study argues that a major flaw in these studies is the assumption that the construct of developmentally appropriate practice is synonymous with "best practice". Measuring the developmental appropriateness of teachers' beliefs and practices may be seen as a way to preserve and justify key tenets of early childhood philosophy. Alternatively, Smith and Croom (2000) appear to have approached the concept with more objectivity in their research investigating teacher beliefs about developmentally appropriate practice and the self-concepts of children, compared with researcher observations of teaching practice. In their study, they used questionnaires with teachers and children, coupled with the researcher observations of classroom practices. Their major findings report discrepancies between developmentally appropriate teaching practice and desirable child development and learning outcomes. Smith and Croom call into question the usefulness of the construct in relation to previous research on teacher beliefs and developmentally appropriate practice. Their research provides support for the present study to adopt an alternative approach to the dominant developmental discourse.

Stipek and Byler's (1997) study included early childhood and junior primary teachers as participants. Using questionnaires, Stipek and Byler researched relationships between teacher beliefs about children's learning, early childhood education, policies on more formal learning and assessment and teachers' own practices. For the early childhood teachers, beliefs and practices could be aligned with child-centred approaches. For primary teachers, beliefs accorded with child-centredness, but many practices were evidence of more structured learning approaches. Parents were cited as a source of pressure for the latter.

Teacher beliefs about subject knowledge

Teachers are very influential in determining how children react to different curricula, in terms of teacher enthusiasm, beliefs and subject knowledge (Chambers & Howe, 1997). The studies reported in this section are investigations of beliefs about subject knowledge in the early years. Studies conducted in the United Kingdom suggest that practising teachers' negative attitudes to subject knowledge may be a crucial element affecting early years teaching (Maynard, 1996; Sanders, 1996; Wood & Attfield, 1996). Maynard's (1996) project researched a professional development programme offered to early years teachers. Initially, teachers demonstrated three types of objections to subject content knowledge. Ideologically, teachers were resistant to subject knowledge as they felt it threatened a child-centred approach to teaching. Political objections to the demands of a subject-based national curriculum were evident. Personal objections became apparent when teachers recognised the gaps in their own subject knowledge base. Through action research and discussions, changes occurred to enable teachers to reconcile and integrate understandings about subject knowledge into child-centred pedagogical practices.

Studies on teachers' professional development in New Zealand address the issue of subject knowledge. Jordan (1998) discusses early childhood teachers' use of technology to increase their subject content knowledge in order to support children's learning. Teachers' recognition of their lack of subject knowledge in teaching and learning interactions is one feature of Jordan's PhD study about pedagogical approaches that promote learning in early childhood settings (personal communication, August 2002). Young-Loveridge, Carr and Peters (1995) conducted a study involving early childhood teachers' professional development which demonstrated that when awareness of mathematics was enhanced, teachers extended children's mathematical knowledge and thinking during play. Parsonage (2001) conducted practitioner research in her sessional kindergarten, analysing four-year-old children's learning stories (Carr, 2001a) for links to the mathematics curriculum children study at primary school. Parsonage's findings demonstrated the mathematical potential in each learning story and identified that it was teacher knowledge, enthusiasm and confidence that determined how this potential was realised in children's learning. Parsonage asserts that greater provision of professional development may be required to ensure that teachers' subject knowledge can maximise children's learning in this essential learning area.

Studies undertaken in other countries have also investigated early childhood teachers' beliefs and knowledge in relation to subject content. Kallery and Psillos (2001) investigated the science content knowledge of teachers of five-year-olds, revealed through teachers' responses to children's questions. Responses were categorised with only 21.9% of responses demonstrating sufficient scientific conceptual knowledge. Moreover, as Wilson, Shulman and Richert (1987) pointed out, having the knowledge is one thing, being able to explain it in a way that young children understand requires further skill. The findings of Kallery and Psillos (2001) are of concern for those promoting subject knowledge in the early years. In a study of 62 early childhood teachers' beliefs, Ure and Raban (2001) found that teachers were unsure of their role in relation to early literacy and were eager to improve both their knowledge and practice. Ure and Raban's study used a combination of questionnaires and interviews. An important outcome was that interviews promoted teacher reflection on both knowledge and practice.

Teachers' confidence in and orientation toward subject knowledge

Teachers' beliefs in terms of self-efficacy (Bandura, 1997) are also relevant in relation to subject content knowledge. Bandura defines self-efficacy as a person's belief in their capabilities to organise and implement positive courses of action, both in themselves and others. Pajares and Miller's (1994) study of secondary student teachers' self-efficacy in relation to students' mathematical problem-solving demonstrated the significance of self-efficacy over other factors related to teaching knowledge and ability. A recent New Zealand study of primary student teachers' self-efficacy in singing (Boyack, 2000) demonstrated that those with high self-efficacy were more likely to provide singing experiences for children confidently, while those with low self-efficacy either avoided classroom singing or organised other teachers to provide this curriculum experience. Findings from Welch's (1998) longitudinal studies of children's singing suggest that children can master musical competencies appropriate to their culture. Two key factors promoting children's musical competence are adult support and frequent participation opportunities in the early years. On the basis of these studies, it could be argued that subject knowledge contributes to teacher self-efficacy in terms of confidence, affecting the frequency and appropriateness of curriculum experiences provided, pedagogical strategies and children's learning outcomes.

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Wagner (1987) contends that teachers' willingness to undertake professional development is affected by fears about their effectiveness. She describes these as "knots" in teacher thinking that also affect innovation in the curriculum. It seems likely that practising teachers' beliefs about their own subject knowledge will impact both on the innovativeness of the curriculum provided for children and on teachers' ability to effectively construct knowledge with children. Findings from an action research project in the United Kingdom involving mathematics (Anning & Edwards, 1999) support the notion that early years teachers who are confident about their subject knowledge are more likely to recognise and maximise potential learning in children's play experiences.

A group of studies has investigated teachers' confidence and understanding of subject knowledge. Holroyd and Harlen (1996) investigated 514 primary teachers' confidence in, and their understanding of, science and technology subject content and their teaching of these subjects. Their findings demonstrated a positive correlation between confidence and teaching ability. Smith and Neale (1989) analysed the subject content knowledge and beliefs of ten primary teachers through use of videotape and interviews. They discovered that primary teachers with more confidence about science subject knowledge were better able to plan learning experiences that facilitate children's understanding of science concepts. Kallery and Psillos (2001), through questionnaires, and Wenner (1993), through knowledge tests, surveys and a rating scale of beliefs, researched early years teachers' scientific conceptual knowledge. Both studies found that teachers' incomplete science knowledge affected their levels of confidence. Without sufficient grounding in declarative or discipline-based subject knowledge, teachers may promote inaccurate conceptual knowledge and thinking. By not taking responsibility for subject knowledge in relation to science, early childhood teachers have been accused of promoting "magical" thinking in children (Bredekamp & Rosegrant, 1992).

A further link with the research on self-efficacy, is concern that early childhood teachers uncomfortable with their level of subject knowledge may therefore rarely include subjects such as science in the learning environment they provide. This forms the null curriculum (Carpenter, 2001), that is, programme content that is consciously excluded from children's experiences. Owens (1999) attempts to justify this lack of provision with regard to science by describing how teachers might include science in child-centred "everyday conversations" with children. However, it could be argued that none of Owens'

suggestions promote deep conceptual scientific learning and excuse teachers from addressing their lack of subject knowledge. Similarly, in relation to mathematics, Peters (2001) argues that a "maths is everywhere" approach excuses teacher planning and involvement and is counterproductive to children's effective learning of numeracy. In Sanders (1996) discussion of the impact of the challenges created by curriculum reform in the United Kingdom, she concluded that early years teachers must either take responsibility for articulating their child-centred pedagogy or resolve their personal feelings about subject knowledge. She declared that early years teachers must address their lack of subject knowledge.

In a review of existing research, Aubrey (1994) suggested that early years teachers may have distinct orientations to different subjects as well as a divergent knowledge and belief base, and suggested this as an area for future research. For example, teachers may adopt a child-centred approach to literacy and creativity and a more didactic approach to mathematics and science. Teachers' beliefs about learning theories and children's learning styles will also impact on the incorporation of subject knowledge in teaching episodes. For example, teachers' beliefs about children's cognitive development and learning, theories of how and when reading and writing should be taught, philosophical orientations towards maturation and development, and personal experience, influence thinking and practices of early literacy experiences (David, Raban, Ure, Goouch, Jago, & Barriere, 2000). Other influences may include parental expectations and any relevant policy or curriculum guidelines that may exist.

Polarised views in the early years

The early years field appears polarised on the matter of subject knowledge. There are some passionate claims denying the value of subjects. Hurst and Joseph (1998) assert that a subject-based approach to curriculum is contrary to the ways in which children think and learn. They maintain that cross-curricula themes, dimensions and skills are best for children. Nutbrown (1999) alleges "In reality, young children do not think in subjects" (p. 110). Whether the curriculum is subject-based or integrated, nowhere in these discussions of teachers' roles and responsibilities in relation to children's learning is the importance of teachers' subject knowledge acknowledged. The rhetoric of integrated, cross-curricula, child-centred and holistic approaches does not absolve teachers from the responsibility to be knowledgeable about subjects in order to extend children's learning.

Other writers comment specifically on the value of teachers' subject content knowledge in the early years. Buckingham (1994), in relation to children's art, notes that specific knowledge about children's drawing is crucial to understanding and supporting children's artistic and creative learning. Wood (1995), while discussing early years teachers' concerns about the requirement to teach history in the curriculum, concludes that teachers' subject knowledge is both important and appropriate. Feasey (1994) argues that the development of the knowledge base of subject matter to do with science and children's scientific thinking is essential for early years teachers. In New Zealand, as part of a study of children's schema development, Meade (1997) reflected on the contribution of teachers' subject knowledge.

> If we stop and think about the understanding that four-year-olds must have developed in order to distinguish between a helix and a plane spiral, it is clear that work on these schemas is hard intellectual work. Can children do this thinking if we don't equip them with the language? Are teachers equipped with such language? (p. 39)

Wood and Attfield (1996) argue that processes that link play and learning need to be examined more critically. They suggest ways in which this may occur; one is by linking play to subjects. In doing so, they acknowledge that children's subject content learning needs to be supported by the subject knowledge the teacher brings to the interaction.

To summarise, much research on teacher beliefs in the early years has focused on developmentally appropriate practice. Recent research (Smith & Croom, 2000) questions this construct as the dominant discourse of early childhood education. An alternative discourse, emphasising a knowledge dimension to children's learning, applies the research from other teaching sectors to consider the place of subject knowledge in the early years. A range of studies and positions were presented to outline current debate on subject knowledge. The research evidence suggests teachers' confidence in their subject knowledge makes a positive difference to children's learning opportunities and outcomes. Some of the studies reported also illustrate Bandura's (1997) contention that beliefs mediate between cognitive knowledge and actual teaching practice.

Parents' beliefs

Parents and family/whānau are an integral part of the early childhood community. Some literature suggests teachers' and parents' views might be different, indeed conflicting. Sharpe (1991) noted in her study of parental involvement in early childhood settings that discrepancies between teachers' and parents' views about appropriate curriculum and pedagogy led to dissatisfaction and difficulties in communication.

Parents' beliefs are formed from a mix of personal and cultural experiences, including their own experiences of education. For example, the collective knowledge of the culture about childrearing practices, particularly from those seen as experts, is balanced with the personal experience of parenting (Lightfoot & Valsiner, 1992). Lightfoot and Valsiner highlight the influence of media advertising on parents' beliefs and practices in relation to children's development and learning. The media was also a pervasive influence on American parents' beliefs that children learn through active experimentation (McGillicuddy-DeLisi & Subramanian, 1996). The latter study found that parents believed children learned through play, exploration and imagination rather than direct instruction. This contrasts with studies cited later in this section.

Parents shape children's learning through the cultural and social interactions engaged in during normal daily life. While no studies have looked specifically at parents' or children's beliefs about subject content knowledge, a range of studies have elicited their perceptions on early education experiences and are useful for informing this research. Parents' perspectives and expectations of quality in early childhood education, and parental involvement in children's learning have been studied.

A group of studies has investigated parents' views of early childhood services. Larner (1996) reviewed research about the reasons why North American parents make choices about early childhood services. Convenience, cost, other parents' opinions and the age of the child were the most important criteria. Their primary criterion for quality was the way they perceived the safety of their child. Smith and Barraclough (1997) uncovered similar criteria in their New Zealand survey of parents' perceptions of quality and their reasons for choosing their children's education setting. Foot, Howe, Cheyne, Terras and Rattray (2000) surveyed 911 Scottish parents about their expectations of early childhood services and followed this up with interviews with 91 parents in Glasgow. These parents' first

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priority was also the safety and care of their children. Only after this did their beliefs about education or the service or cost factors influence decision-making. In Australia, Page, Nienhuys, Kapsalakis and Morda (2001) surveyed 279 parents' expectations of kindergarten for their children and the extent to which their expectations were met. Their main finding was that parents believed kindergarten was primarily for children's social and emotional development, with educational aims a secondary consideration. Parents believed that the social and emotional aims were met, but were unsure if the educational aims were met. It is unclear in the report of this study whether or not the parent participants shared similar beliefs about what the kindergarten's educational aims were.

Parents' perspectives on curriculum and pedagogy

Parents can be a source of pressure for teachers to deliver a structured curriculum. Stipek, Milburn, Clements and Daniels (1992) surveyed 551 parents about their beliefs about teaching literacy and numeracy skills to four and five-year-old children. They also included questions asking parents to prioritise their goals for children's learning outcomes, including self-concept, social skills and creativity. Parents revealed beliefs supporting an academically-focused learning environment and didactic teaching approaches, and reported that they often provided this themselves at home. Sharp and Davis' (1997) research found that parents want to have children learning reading and mathematics formally at an early age. However, the parents in this study also wanted a range of play experiences for their children. Parents of three-year-olds emphasised play, while parents of four-year-olds were concerned to ensure there was a balance between play, and reading and mathematics. Conflict between parents and teachers over appropriate pedagogical approaches was one theme included in practitioners' stories collected during 1994 that led to the development of a code of ethics for professional practice in early childhood in New Zealand. Parents' wishes for a more structured, academic curriculum led to some educators providing inappropriate experiences for children (Cherrington, 2001).

A further study provides indirect evidence of parents' beliefs in reporting teachers' perceptions of parent beliefs. Sylva, Siraj-Blatchford and Johnson (1992) found that as a result of introducing a subject-based national curriculum, including early assessment, in the early years in the United Kingdom, parents began pressurising staff in under fives settings to teach formally. Parents indicated a belief that this would assist their children to

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pass initial tests in primary school. This resulted in some early years educators in under fives settings teaching content to children using didactic pedagogical approaches.

In summary, research on parents' priorities for early childhood education demonstrates that issues of safety and wellbeing are commonly uppermost. When parents consider the education their children receive, they largely favour academic learning over play and state a preference for formal teaching. Elkind (1981) first raised concerns about children being hurried through their learning and development because of rapid societal changes and the influences of these on the contexts in which children were being educated and socialised. Elkind feared that important learning about independence, initiative and self-motivation might be lost to children. The research cited in this section of parental beliefs, influenced by societal change, reflects Elkind's concerns.

Again, few of the studies cited of teachers' and parents' beliefs interviewed adults in groups, focusing instead on questionnaires or individual interviews. A sociocultural perspective would suggest that group interviews as a procedure might reveal a wider range of opinion, and encourage discussion, reflection and challenges to beliefs between participants as they collaboratively constructed their understandings.

Children's beliefs

There has been a recent trend to involve children directly in research in order to understand and improve their educational experiences (Alderson, 2000; Cullen, 1998a; Sheridan & Pramling Samuelsson, 2001; Smith, A., 1998). Alderson (2000) asserts that children have voices, but that adults need to listen. When adults listen to children, consult them, and respond perceptively and meaningfully, they increase children's competence and confidence and may improve their educational experiences. "When teachers listen to what the children are really thinking, they frequently stand in awe of their understandings and insights" (Jordan, 2002, p. 4).

Reifel (1988) reviewed studies that directly sought children's perceptions of their early childhood experiences through individual interviews. These provide a source of information and insight on learning expectations and outcomes. Reifel reported that research indicates that children as young as three have an understanding of daily events and routines and that by five years, their descriptions are both accurate and detailed. He

also noted that discrepancies between teachers' and children's understandings occurred, particularly with regard to a distinction between "play" and "work". Children perceived that more "work" occurred during the day than did the teachers. He described as "worrisome" (p. 64), for socialisation and transition to school, instances of children who stated the expected routines, but then noted that they personally did not conform to these. An alternative interpretation, from a sociocultural perspective, would view these children as knowledgeable, independent and confident, and as also having skills of metacognition.

Children's perspectives on curriculum and pedagogy

Children's viewpoints can inform the planning of their learning environments. Cullen (1991) interviewed children about preferences in the early childhood environment that they would like to see transferred to their junior primary setting. In response to children's preferences, teachers included more experiential learning in the year one class. Cullen also investigated the strategies children used for learning in early childhood and whether these were maintained in the junior primary class. Constraints related to the differing contexts and divergent pedagogical approaches utilised affected children's transfer of useful learning strategies.

Langsted (1994) used teenagers to observe young children during the daily routines of an early childhood centre and report on these, on the assumption that teenagers' observations and interpretations were likely to be more accurate than adults in terms of children's preferences. Langsted then reports on interviewing five-year-old children to complement the observations in the centre. The children were acknowledged as experts on their own lives and were highly motivated to participate in the interviews. Langsted concluded that information gained could not have been acquired by any other method. As a result of the study, routines and procedures in relation to children's choices of indoor or outdoor play and meal and drink breaks were altered to give children more autonomy.

Sheridan and Pramling-Samuelsson (2001) interviewed 39 five-year-old children from six settings about their opportunities to participate in decision-making. Children expressed a preference for play with friends, and revealed that they negotiated decision-making during play with them. With regard to teachers, while initially they felt they had little choice about their play, after probing, they made comments such as "I decide what to paint, but not when" (p. 184). They felt that teachers did not always understand what their

preferences were or give them much opportunity to participate in decision-making about curriculum.

The studies reviewed in this section demonstrate that children have valid views of situations, people, and events, which can inform decision-making and teaching practices. Sheridan and Pramling-Samuelsson (2001) concluded that a current challenge for early childhood education is to create opportunities for children to have input into the curriculum and pedagogical strategies they experience.

Sheridan and Pramling-Samuelsson noted as a limitation in their study that not all children demonstrated metacognitive ability. Metacognition refers to children's ability to think and reflect on their learning, become aware of how they might approach future learning and consider the perspectives of others. Specifically, in their study, for children to be able to respond to some questions required them to be able to consider and interpret teachers' thoughts. As noted earlier in relation to studies of children's prior knowledge, individual interviews were conducted with children in these studies. The potential of group interviews has not yet been sufficiently ascertained. These may also promote children's metacognitive abilities, such as memory and recall, as children assist each other's contributions.

Curriculum in early childhood education

A curriculum document is itself a statement of beliefs and values. Impressions of what constitutes curriculum are also embedded in beliefs. Mainstream discourse has commonly conceptualised curriculum as content, due to the emphasis on subject-based curricula in the primary and secondary sectors. Early childhood has utilised a range of curricula approaches. While these vary in philosophy and approach, they commonly ignore or underemphasise curriculum content (MacNaughton, 1999), demonstrating what Edwards and Knight (1994) describe as "a history of official indifference to curriculum content for the under-fives" (p.47). Consequently, consideration of teachers' or children's subject knowledge is also generally omitted.

Early childhood education in New Zealand has avoided the term "curriculum" until recently. The first draft of *Te Whāriki* demonstrated a preference for "programme". The word "curriculum" first appeared on the title of the final version in 1996, with criticism

raised about the input of non-early childhood people into this version of this document (May, 2001). A contrary viewpoint is that such input, including promoting the term "curriculum", helps to position early childhood within mainstream discourse. A contemporary approach to curriculum has encouraged a critical stance as to the values underpinning curriculum (Cannella, 1997; Dahlberg et al., 1999), such as the earlier critique of developmentally appropriate practice, and recognition of curricula as complex, contextual and culturally-bound. This approach is consistent with a sociocultural perspective.

Curriculum has been variously defined in early years education. In the United Kingdom, an early definition of curriculum for the early years was "the concepts, knowledge, understanding, attitudes and skills that a child needs to develop" (Department of Education and Science, 1990, cited in Abbott & Rodger, 1994, p. 9). Although this definition recognised the importance of conceptual knowledge that subject content knowledge promotes, it also risked neglecting the sociocultural origins of knowledge if knowledge was interpreted in a prescriptive or academic manner.

A recently revised definition is of curriculum as a term "used to describe everything children do, see, hear or feel in their setting, both planned and unplanned" (Department for Education and Employment, 2000, p. 2) which appears to now neglect consideration of conceptual knowledge. This echoes *Te Whāriki's* broad definition of curriculum as "the sum total of the experiences, activities, and events, whether direct or indirect, which occur within an environment designed to foster children's learning and development" (p. 10). Such a broad definition of curriculum potentially lacks guidance to teachers with regard to content, because it focuses on the environment of the learning rather than teachers' and children's knowledge. This lack of guidance, coupled with an integrated, holistic approach, leaves teachers unclear about what kind of conceptual knowledge is appropriate for young children, how to teach it, and what knowledge teachers need themselves to support children's learning. The present study argues that a knowledge dimension and teaching and learning strategies to foster this are underemphasised currently within early childhood curriculum and pedagogy.

Consistent with a sociocultural approach, Blenkin and Kelly (1997) describe curriculum succinctly as consisting of experiences that are valued by a society, and that these should not be left to chance, but planned for meaningfully. Curricula outcomes for children ought then to be related to the societal expectations of adults (New, 1999). David and Powell (1999) further support this argument in stating that a curriculum "may have crucial long term consequences for society. We have to decide what kind of people we want our children to be and to become" (p. 208). This is reflected in *Te Whāriki's* overall goal for children "to grow up as competent and confident learners and communicators, healthy in mind, body, and spirit, secure in their sense of belonging and in the knowledge that they make a valued contribution to society" (p. 9).

Underpinnings of early childhood curricula

Curricula used in early childhood programmes have been characterised by diversity and based on changing philosophical and theoretical traditions. The beliefs of Froebel, Isaacs and Dewey were influential in promoting play in early childhood education. The influence of Piaget's research and the child study movement in the United States of America in the 1960s led to curricula devised on notions of developmental stages, seen to be universal in children's development. The notion of developmentally appropriate practice has been described and critiqued as potentially limiting children's opportunities. The shortcomings include its normative approach, and its neglect of both subject knowledge and the complexity of developmental and cultural influences on children's education experiences.

During the 1960s, some curricula began to be based on notions of social justice and equity. Early childhood education became seen as a means to rectify social disadvantages, with curriculum and pedagogy embedded within social, political, economic and historical. contexts (Anning & Edwards, 1999; Cannella, 1997). Some programmes focused on providing assistance for children from low-income families to develop social competence and learning skills in a compensatory model, assuming deficits in relation to middle-class children. An emphasis on cognitive and academic skills was based on a belief that developing school readiness was a primary task of early childhood education and that early intervention could overcome socio-economic disadvantage (Marcon, 1999, 2002). It is also based on a belief that these skills are important for functioning effectively in the adult world.

The popular discourse of early childhood curriculum

Examination of popular early childhood discourse finds terms such as "free-flow play" and "integrated curriculum". Uninterrupted free-flow play has the capacity to promote depth of learning in children, but teachers must be actively involved in the play in order for this to occur (Bennett, Wood & Rogers, 1997). Rodger (1995) argues that curriculum based on child development and play leads to the omission of some kinds of knowledge in programmes for young children, specifically citing subject knowledge. Providing stimulating experiences and challenges in addition to the normal play environment to promote higher-order thinking and inquiry processes and social construction of knowledge, is in keeping with recent research on children's knowledge that promote children as competent and capable learners (Watson, R., 1996).

A child-centred curriculum is another key tenet of early childhood philosophy. This is commonly taken to mean that the child is the focus of curriculum, programme and pedagogy. It is often also used synonymously to mean a child-initiated, integrated, play-based curriculum. Within a child-centred curriculum, the child chooses the experiences to be involved in and is responsible for the learning and thinking that results. The teacher's role is to listen and observe and follow children's leads. This does not promote teachers having an active role in pedagogy or suggesting ideas or interests. Without explicit input, teachers are supposed to somehow develop children's conceptual understanding. Moreover, children's self-choice of learning experiences from a wide range of activities provides one justification for integrated curriculum, but may not necessarily ensure learning is coherent. Furthermore, Tinworth (1997) makes a distinction between child-centred and child-initiated curriculum. She describes child-centred curriculum as one "based on an estimation of children's needs and interests" (p. 25) whereas in child-initiated curriculum the child has an active role in the initiation of interests, questions and hypotheses and becomes a collaborator in explorations and inquiry processes. Chung and Walsh (2000) indicate that the historical complexities in the usage of the term "child-centred" call into question the simplistic meaning it is often assumed to possess.

Early childhood curriculum from a sociocultural perspective

A sociocultural approach to curriculum emphasises the relationships and interactions that promote intersubjectivity. Learning leads development and children have an active role to play in constructing their learning experiences (Smith, A., 1996). Teachers are advised to

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follow children's interests to create planned and evolving curriculum (Ministry of Education, 1996, 1998).

The challenge to acknowledge a sociocultural approach to curriculum has contributed to the recent prominence of Reggio Emilia (Forman, 1996) and project approaches (Helm & Katz, 2001; Katz & Chard, 2000). Thematic curriculum has been re-legitimised, and the concept of emergent curriculum proposed (Jones & Nimmo, 1994). These approaches encourage teachers to develop curriculum that is relevant to the realities and contexts of children's lives. Curriculum emerges dynamically in response to children's interests, rather than relies on children's self-initiated play and a developmental focus to lead it. This concept is currently being described as "authentic" curriculum. Authentic curriculum is seen as being process-oriented, empowering children, based on perceptive observations of children and involving authentic evaluation and parental input (Lambert & Clyde, 2000). This is consistent with a sociocultural perspective. However, while integrated (i.e., developmental and play-based) curricula, including emergent and project approaches, have been conceptually appealing to many teachers and researchers, how these contribute to children's learning and knowledge has not been sufficiently investigated. Moreover, children's interests do not emerge in a vacuum. Opportunities for children to develop interests may result from teachers introducing novel experiences based on their own specialist knowledge and interests.

Te Whāriki supports both a developmental and a sociocultural approach to curriculum. Curriculum provision is suggested for three broad age groups: infants (birth to 18 months), toddlers (one to three years) and young children (two-and-a-half years to five years), supporting the notion of norm-related stages of development. *Te Whāriki* describes what children should have the opportunity to learn in the strands and goals, and how this learning should be taught in the principles. Suggested curriculum provision and reflective questions for teachers fall within these divisions. The principles of *Te Whāriki* (relationships, empowerment, family and community, and holistic development); its emphasis on the responsive and reciprocal relationships inherent in intersubjectivity, and its focus on learning occurring through people, places and things (e.g., cultural tools such as play equipment) support a sociocultural emphasis. *Te Whāriki* is designed for each early childhood setting to weave its own curriculum, reflecting the social and cultural context in which each is embedded.

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Excursions in early childhood curriculum

From a sociocultural perspective of curriculum, an excursion is a social and cultural event through which learning is promoted. Excursions, or field trips, are a common component of early childhood programmes. They are perceived as a means of enriching the curriculum through providing first-hand experience of people and places in the community to support children's learning (Van Scoy, 1995). Much of the literature available about excursions is advice to practitioners about potential places to visit, practical tips for planning and undertaking the trip safely, and suggestions for activities (e.g., Jackman, 2001). Research on the efficacy of excursions in terms of children's learning is rare.

DeMarie (2001) and DeMarie, Norman and Abshier (2000) reported how age and prior number of visits influenced children's experience of a trip to the zoo. The number of prior trips to the zoo was significantly correlated with the amount children recalled during a follow-up interview. In the present study it was also likely some children would have been to the place of the excursion previously. The 3-5 year old cohort of DeMarie's study did not mention any more animals in post-excursion interviews than pre-excursion interviews. The children reported more interest in aspects of the environment such as cracks in the concrete and other children's shoes, and were reported as unable to offer a meaningful reply to the question of "What was the most important thing you learned at the zoo?" Given that both children's prior knowledge of animals were ascertained and preparatory experiences were provided for the children prior to the excursion, this researcher was surprised by the finding that children's knowledge had not increased as a result of the excursion. Perhaps the importance of including focused opportunities for meaningful interactions between adults and children during an excursion and providing follow-up experiences for children to further explore new knowledge and thinking is highlighted by DeMarie's finding.

Also of potential relevance to the present study are research findings of studies of children's memory. Hamond and Fivush (1991) investigated the retention of information of three and four-year-old children's visits to Disneyworld with their families. Children were interviewed either six months or eighteen months after the visit, with the length of time proving to be insignificant. All children recalled accurate information. Two findings of potential relevance to the present study were that the older children recalled information more spontaneously than younger children, and that evidence suggested that those children

who talked about the experience with their families more, including looking at photographs, recounted more during the interview. This supports that recall and discussion opportunities are crucial to cementing learning. The major finding of Hamond and Fivush's study was that children "demonstrated impressive memory abilities over extremely long periods of time" (p. 444).

Butler, Gross and Hayne (1995) researched children's memory and recall of an excursion to a fire station in Dunedin one day and one month following the experience. Children aged three and four in their study reported accurate information after both time intervals. Hamond and Fivush's (1991) and Butler, Gross and Hayne's (1995) studies provide further evidence for the approach of this study to regard children as competent and knowledgeable. Undertaking meaningful excursions may not only enrich the curriculum, but also provide opportunities for children's metacognitive development. Furthermore, excursions have the potential to enhance children's knowledge.

A pedagogical paradox in the early years?

Dewey (1902, 1938) proposed that young children's learning experiences be based on play. However, he noted that in order to be educative, such experiences ought then to lead onto subject knowledge and problem solving experiences. A common concern among writers is that where subject knowledge is applied across the early years, the effect will be that of a "push-down" curriculum (Curtis, 1998). This means that early childhood programmes may appear similar to early primary school programmes in both content and pedagogy. Anning (1992) reported that primary teachers in the United Kingdom resisted the introduction of subject based curriculum. The reasons for this appear similar to the objections cited earlier, that is, that teachers value an integrated curriculum, assert that young children do not see knowledge as separate subjects, and believe that curriculum planning should be based on children's interests and experiences. Anning and Edwards (1999), also writing about the United Kingdom, noted that many teachers felt vulnerable and lacking in appropriate knowledge to teach subjects to four-year-olds as part of the junior primary curriculum. Being passionate and knowledgeable about appropriate early childhood pedagogy, and subject content knowledge itself, were important in counteracting pressure to teach more formally.

Research about declining literacy and numeracy knowledge in various western countries has led to some pressure for children to be formally taught earlier. This early start is seen as having a later advantage to the country's economy (Bempechat & Drago-Severson, 1999; Grieshaber & Ashby, 1997). A valid fear in relation to a "push-down" effect in New Zealand is raised by the assessment of children as they begin junior primary school. In 1997, the Ministry of Education issued a School Entry Assessment kit on literacy, language and numeracy to assess children's learning after six weeks at primary school. If the effect of such assessment is to create a different programme for four-year-olds, concern about inappropriate pedagogy and curriculum is heightened, particularly in light of Marcon's (1999, 2002) research findings that there are no long-term gains from such approaches. Some research has demonstrated the opposite: that later achievement is lower for children taught didactically than for children who have learned in a play based, child-initiated environment (David, Raban, Ure, Goouch, Jago & Barriere, 2000; Marcon, 2002). This further suggests that how teachers assist children to acquire subject content knowledge is a central pedagogical issue for early childhood education.

Edwards and Knight (1994) argue that a subject-based curriculum is not necessarily a fragmented curriculum. While currently there is limited research in this area, Rodger's (1995) study of a junior primary classroom demonstrated that while children focused on activities emphasising geography, skills of literacy and numeracy were incorporated. She argues that a shift in emphasis to a subject-centred curriculum therefore does not necessarily detract from children's integrated learning. Similarly, Peters and Jenks (2000) demonstrate how mathematical concepts can be integrated within a range of other learning experiences available in an early childhood setting. Certainly, whether the curriculum is subject-centred or integrated, research about children's knowledge supports the view that teachers need to have broad subject knowledge in order to extend children's learning (Cullen, 1999; Wood & Attfield, 1996).

While it has been expected in primary and secondary education that teachers ought to know the subject matter that they teach, this has not been evident in early childhood education. Early childhood education in New Zealand appears to be currently caught in a pedagogical paradox (Edwards & Knight, 1994) with regard to subject content knowledge. This paradox describes the dilemma teachers are caught in between two extremes of beliefs

about whether or not teachers' subject knowledge is a consideration, whether or not constructing children's subject knowledge is a priority in the curriculum, and what constitutes appropriate pedagogy within the sector.

Although early childhood researchers and educators passionately defend their child-centred, integrated philosophy, there is also undisguised delight and a feeling of vindication in the New Zealand early childhood community from the latest results of the longitudinal study known as the Competent Children project (Wylie, Thompson & Lythe, 2001). This project has measured the impact of early childhood experience on children's achievement at ages five, six, eight and most recently, ten. At age ten, alongside other influences such as maternal education levels, the length of early childhood experience made the most long-term impact on mathematics and literacy competencies. The researchers indicated that factors that contributed largely to these findings were staff who were knowledgeable about and responsive to individual children, asked open-ended questions of children, allowed children time to complete activities, guided children in centre activities and included some cognitive content in their interactions to develop children's thinking and theorising. These factors provide strong support for the present study: a focus on teachers' relationships with children, knowledge of children's prior subject knowledge and interests, an active approach to pedagogy and a focus on teachers' subject content knowledge.

May and Carr (2000) note that the New Zealand government has a vision for a seamless education system from early childhood through to tertiary. While *Te Whāriki* attempts to show links between the two curricula used in the early years, "in reality there is a mismatch and disruption for children at age five as they move from early childhood programmes into the early school years" (p. 163). Differing theoretical perspectives and curriculum philosophies underpin each curriculum. *Te Whāriki*, is made up of principles, strands and goals that focus on learning strategies and dispositions. Dispositions may include confidence, curiosity, perseverance, communication, co-operation and resilience (Perkins, Jay & Tishman, 1993). The *New Zealand Curriculum Framework* is organised into seven essential (subject-oriented) learning areas. In consideration of the dual curricula used across the early years, challenges to incorporate explicit content knowledge within early childhood education in Aotearoa/New Zealand have recently emerged (Allsop, 2000; Cullen, 1999).

Therefore, early childhood education commonly rejects formal approaches to teaching and learning, yet subject-based outcomes are seen as desirable. *Te Whāriki,* although mentioning literacy and numeracy, does not specify subject content nor how to teach it through play-based experiences evolved from children's interests. By not discussing or prescribing subject content, *Te Whāriki* leaves this to the interpretation of the teachers. This becomes particularly crucial when it is specified that children's interests should generate the curriculum. In themselves, children's interests alone are insufficient for extending children's learning and providing a basis for teachers' planning (Raban, 2001). Children's interests can also be stimulated by the special activities and interactions provided by teachers. Furthermore, Cullen (1996) claims that in addition to knowledge of children's experiences and interests, teachers need to have pedagogical and subject knowledge in order to extend children's knowledge. A teacher's own interests and depth of subject knowledge therefore impact on the opportunities and experiences presented to children and, in turn, provide novel learning opportunities for children.

Currently, in settings using *Te Whāriki* as a basis for planning, curriculum content is likely to be influenced by contextual factors such as teachers' education levels and beliefs about curriculum (McMullen, 1999; Vartuli, 1999). Dispositions related to subject learning, for example, the disposition to think mathematically (Anning & Edwards, 1999) or technologically (Carr, 2001b), may not be emphasised. Edwards and Knight (1994) use the term "groundwork" to emphasise the role of early years teachers in providing children with early forms of subject knowledge and skills of inquiry. They suggest "that any notion of the early years curriculum as the seamless web of experience is counter-productive to empowering children to operate effectively with commonly accepted categorisations of public knowledge" (p. 24).

Concerns, contrasts and contradictions

Te Whāriki and *Quality in Action: Te Mahi Whai Hua* (Ministry of Education, 1998) outline ways of planning, assessing and evaluating curriculum in early childhood in Aotearoa/New Zealand. However, the Education Review Office (ERO) (1998) noted that many centres do not appear to "articulate or pursue high-quality expectations, especially in respect of children's cognitive capabilities" (p. 5). ERO also criticised *Te Whāriki* as not being sufficiently concerned with preparing children to have appropriate literacy and numeracy knowledge upon school entry.

On the surface, the emphasis in *Te Whāriki* appears to be primarily on children's affective development and learning through strands named as wellbeing, belonging, communication and contribution. The only strand that indicates significant expectation of cognitive capabilities is exploration. Literacy and numeracy are only visible through mention of symbols in one goal within the communication strand. However, this division becomes less arbitrary if teachers view cognition as embedded within the other strands as could be argued from a sociocultural perspective. From the perspective of situated cognition (Vygotsky, 1978, 1986), learning is more holistic. Learning does not reflect a narrow cognitive focus, but involves social and emotional aspects (Rogoff, 1990, 1998).

One principle of *Te Whāriki* is holism. The philosophy of integrated curriculum that this represents means that the document was developed on the premise that the curriculum would not divide learning into subject or knowledge areas (Carr & May, 1996). Yet the principle of holism espoused in *Te Whāriki* may not be incompatible with an increased focus on subjects. Consideration of subject knowledge is in keeping with the emerging research on links between subjects and integrated curriculum cited earlier, and because of the subject-based curriculum that young children go on to experience in junior primary settings (Ministry of Education, 1993). The Education Review Office (ERO) (1998) reasons that "In failing to identify a positive relationship between early childhood education and school education, *Te Whāriki* creates the impression that early childhood education exists in a vacuum, is complete in itself and has no relationship with further learning" (p. 12).

ERO's (1998) report occurred less than two years after the final version of *Te Whāriki* was published. Implementing the curriculum document is complex given that each setting is to weave its own contextually and philosophically relevant curriculum. Limited government-funded professional development was provided to assist centres to implement *Te Whāriki*. Not many had had this opportunity by the time of the ERO report. In addition, criticism has been raised about the presence of non-early childhood people on review teams. May (2001) notes that "the holistic principles, strands and goals were not easily understood or measured by ERO's mainly school-sector reviewers" (p. 246). Nevertheless, the relationships between the principles, strands and goals and children's learning outcomes ought to be able to be recognised, and documented by early childhood teachers, to inform those inside and outside the sector, including parents and ERO reviewers.

In relation to subject knowledge, Backshall (2000) conducted an investigation into how science content is addressed in *Te Whāriki*. She notes that the exploration strand uses the same terminology as the *New Zealand Curriculum Framework* by identifying science as the living, physical and material world, and the planet earth and beyond. However, no guidelines are given as to what content may be covered. She questions whether "teachers have the appropriate depth of content knowledge to provide high-quality teaching and learning" (p. 43) and asserts that a teacher "with science subject knowledge could see science content represented in all five strands of *Te Whāriki*. Others may not be aware of the potential" (p. 44). Ellis' (1996) investigation of New Zealand early childhood teachers' use of an interactive science centre in their local area supports this concern. One of her findings was that teachers who had a stronger secondary science education were more likely to recognise the potential in the science centre and be able to link this to curriculum provision.

Similarly, with regard to literacy and numeracy in *Te Whāriki*, the amount and depth of content is largely the responsibility of teachers, and relies on teachers' subject content knowledge, including interpretation of terms such as "symbols". A more recent publication (ERO, 2000) criticises some methods of assessment in early childhood education in the areas of literacy and numeracy. This report also notes that a potential effect of emphasising knowledge such as literacy and numeracy is a consequent focus on structured, formal academic learning that is inappropriate in early childhood education. In a sociocultural approach to curriculum, literacy and numeracy events emerge from actual daily experiences. For example, cultural events such as excursions provide opportunities for literacy activities such as drawing, dictating and writing stories. ERO's report affirms that the purpose of assessment in early childhood is to inform the provision of quality learning experiences that meet children's needs and interests rather than provide a summative statement of achievement for each individual child.

A way forward?

The overview provided in this chapter of the range of theory, research and philosophies that shape current thinking about early childhood curriculum and pedagogy reveals a diverse and somewhat eclectic literature in which to ground this study. Investigations of subject knowledge can be reconciled with a sociocultural perspective. Literature from research in the primary and secondary education sectors identifies clearly that subject

knowledge makes a difference to teaching and learning. Effective teachers know how to select content and to identify successful teaching strategies. They know how to present information to children in ways that enable children to learn. Where the teachers' subject knowledge is deeper, teachers are more likely to be confident about integrating curriculum, be aware of their own subject knowledge gaps, and be more open to children's interests, ideas, contributions, questions and comments, particularly in relation to children's existing knowledge. This has potential implications for early childhood teaching that emphasises child-led inquiry at the expense of subject learning.

This review has identified that subject content knowledge is a significant component of teachers' knowledge base in primary and secondary teaching. Currently, knowledge and beliefs on subject knowledge need to be extrapolated and theorised for their relevance to early childhood education. Claims made in the early childhood literature that subject knowledge is not significant are based on philosophical ideals and a concern that attention to subject content knowledge will lead to inappropriate curriculum and pedagogy. This perspective has meant that little attention has been paid so far either to the subject knowledge of teachers, or to the fact that the New Zealand early childhood curriculum, *Te Whāriki*, is inexplicit in relation to content. In this regard, ERO has raised specific concerns about literacy and numeracy, and argued that teachers do not articulate high cognitive expectations of children's learning.

Conversely, the interactions of teachers and children in learning communities, viewed from a sociocultural perspective, highlight the importance of intersubjectivity and ensuring meaningful learning is constructed. To ensure the latter, knowledge of children, such as their backgrounds, prior achievements, subject knowledge and interests is paramount. Recent research has revealed that children bring significant prior knowledge to their learning and teaching experiences. In response to this research, teachers' subject content knowledge has begun recently to be thought of as a substantive component of early childhood curriculum and pedagogy.

Teachers' judgements in pedagogy and curriculum must be based on understanding of teaching, learning, learners, subject matter, context, and how these factors interrelate in the process of knowledge construction. The literature on teaching identifies knowledge and skills that can increase the ability of teachers to promote learning in children. Such

research also reaffirms the place of the learner at the centre of the learning process. This has been a position long advocated by early childhood teachers, reflected in the concept of child-initiated learning. Research on teachers' subject knowledge appears to have value for the early childhood sector. Further research may support those writers who claim that subject knowledge is indeed important in early years teaching. However, the literature also reveals that teacher beliefs may mediate between teachers' knowledge and teaching practice.

Research problem

Curriculum from a sociocultural perspective includes a knowledge dimension. Knowledge is constructed through meaningful social relationships and interactions. A knowledge dimension is currently underemphasised in *Te Whāriki*. For sociocultural approaches to be effective, it is suggested that teachers need both an understanding of how to work with young children's knowledge and confidence with their own subject content knowledge (Cullen, 1999; Meade, 1997). This area has not yet been researched adequately in early childhood education. Hence, it is appropriate that the early childhood sector looks to the research base of other sectors to reflect on its knowledge base and contemplate future research directions. Models of teacher knowledge will be examined as one conceptual framework for interpretation of the present study's findings.

Moreover, in the same way that research on teaching in other sectors identified evidence to support that teachers' knowledge facilitated students' learning, research in early childhood teaching must now focus on links between teachers' knowledge and children's learning. Anning (1998), notes seven areas for attention in early years research including, "the quality of adult/child interactions that are most effective in promoting learning within ... teaching and learning episodes, (and) the clarification of the nature and efficacy of 'subject learning' for young children" (p. 310).

A sociocultural approach to curriculum and pedagogy incorporates the beliefs and values of the culture and supports a knowledge dimension. The research problem investigated in this study is generated from the gaps in the literature that arise and the concerns and contradictions that appear. Beliefs have been established as perhaps the single most influential construct in determining the curriculum and pedagogy provided for learners. Literature on primary and secondary teaching suggests subject knowledge is an important

component of a teacher's knowledge base. While recent studies have researched early childhood teachers' beliefs, little research has occurred on beliefs related to subject knowledge. Certainly, no studies have investigated teachers', parents' and children's beliefs about subject knowledge in the same investigation. Furthermore, while excursions are a popular element of early childhood curriculum, there is a need for further research for their links to children's subject content knowledge and how this knowledge is constructed. This review concludes that research-based knowledge about beliefs and practices related to subject knowledge in early childhood education is scarce.

Rationale for this study

Research findings in early childhood education have demonstrated that teachers with both a general education and an early childhood teaching qualification promote positive outcomes for children's social, language and cognitive development (Blenkin & Kelly, 1997; White, K., 1993). Kagan (1992a) considers teacher beliefs as the element most likely to determine the quality of teaching and learning interactions and to also be the clearest measure of teachers' personal growth. Pajares (1992) observed that research is required to uncover the kinds of beliefs associated with effective teaching and learning.

The early educational experiences of children are culturally situated and reflect the varying values and beliefs of the culture (New, 1999). New notes the importance of parents, teachers and community members negotiating educational expectations of children from this perspective. As previously pointed out, studies conducted on beliefs have rarely used interviews with teachers or parents, or group interviews as research techniques. These may shed light on how beliefs and knowledge are shared and negotiated in communities. New also states that a curriculum should emphasise the relationship between goals for children and societal expectations for adults. This idea is clearly reflected in the overall aspiration for children described in *Te Whāriki*.

Subject content knowledge is a form of knowledge thought to ensure educational, social and economic benefits for individuals and societies (Bempechat & Drago-Severson, 1999; Grieshaber & Ashby, 1997). Hence it is appropriate that this research investigate beliefs about subject knowledge, as this is a commonly accepted valued outcome of learning, leading to a productive and contributing adult life. Further, Pajares (1992) noted that "little will have been accomplished if research into educational beliefs fails to provide

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insights into the relationship between beliefs … and teacher practice, teacher knowledge and student outcomes…" (p. 327). This review also indicates that research on children's knowledge, teachers' subject content knowledge and on teachers' beliefs and practice has not yet been combined. Research that provides insight into the beliefs and knowledge held by teachers, parents and children about subject knowledge, the ways in which children's subject knowledge is extended and enriched, and how beliefs influence effective curriculum and pedagogy is required in early childhood education, and is the focus of the present study.

Chapter Three
METHODOLOGY

Merriam (1998) states that research focused on "discovery, insight, and understanding from the perspectives of those being studied offers the greatest promise of making significant contributions to the knowledge base and practice of education" (p. 1). Robinson (1998) suggests that longitudinal and ethnographic studies, and collaborative and interpretive approaches to shared meaning-making with participants, would enhance the useful knowledge generated by research for teachers.

The present study involved the researcher in several weeks' intensive investigation of beliefs and practice within a context, linked to a cultural event, an excursion. *Te Whāriki* acknowledges the importance of children learning through people, places and things. Within the strand of "belonging", the importance of children obtaining experience with the outside world is acknowledged, and within the strand of "exploration", that children have opportunities to learn about the natural, social, physical and material worlds. Hence it was appropriate that this research use an excursion as the chief mechanism to explore beliefs about subject knowledge. Previous research has established the value of an excursion as a mechanism to explore children's memory development (Butler, Gross & Hayne, 1995; DeMarie, Norman & Abshier, 2000) and induction into social and cultural practices (Fasoli, 2001).

Research questions

The research questions guiding the present study were:

1. What beliefs about subject content knowledge are held by New Zealand early childhood teachers?
2. What beliefs about subject content knowledge are held by parents involved in early childhood education?
3. What beliefs about subject content knowledge are held by children involved in early childhood education?
4. In what ways do these beliefs about subject content knowledge inform early childhood curriculum and pedagogy?

To form an overview of this chapter, the research design is first described. The chapter then elaborates on the methodology used. Information on the case study setting and participants is provided, and ethical considerations pertinent to this project are discussed. Data collection techniques are described. Issues of validity and reliability, including methodological constraints, are identified. Finally, data analysis procedures are outlined.

Research design

An interpretivist methodology was used in the present study. A public kindergarten was the setting for a case study. The beliefs of teachers, parents and four-year-old children were sought, and learning and teaching interactions were observed. The researcher spent seven weeks as a participant-observer in the research setting. Fieldnotes were written for the duration of this period, focusing on learning and teaching interactions observed, both generally and in relation to the excursion. Curriculum planning and evaluation meetings were attended and documentary evidence was collected.

Prior to the excursion, group interviews occurred with teachers, parents and children, to establish their beliefs about subject content knowledge, using the excursion as a focus for the discussion. Further interviews with each set of participants occurred after the excursion to ascertain links between beliefs and practices about subject knowledge, and to explore ideas raised during the first set of interviews. Observed incidents, photographs and diary notes were used to trigger conversations and questions with each set of participants. Findings of the study were discussed with the teachers in order to negotiate meaning and ensure the validity of the researcher's interpretation.

Interpretivist research

Curriculum in early childhood education has previously been studied using a range of research methods. In studying cognitive development (e.g., Pramling Samuelsson & Mardsjo, 1998), and curriculum environments and interactions (e.g., Kontos & Wilcox-Herzog, 1997), researchers have established the value of studying learners within their natural learning environment, a key tenet of interpretivist methodology (Hughes, 2001). Interpretivist research is about understanding how people make sense of their experiences within a framework of socially-constructed and shared meanings that include motives, beliefs, values and attitudes (Clark, 1997). "The interpretivist researcher's task is to understand socially-constructed , negotiated and shared meanings" (Hughes, 2001, p. 36).

In the present study, an interpretivist approach generated rich data and acknowledged the position of the researcher to be involved in the study. In an interpretivist approach, the researcher is the main data collection agent (Merriam, 1998). Furthermore, in interpretivist research, questions and methods can be adapted flexibly during data collection (Merriam, 1998). An extended period of time in the case study research setting allowed for informal observation and participation in the daily events and routines of the setting. This initially allowed relationships to be built and accustomed the participants to the researcher's presence. Later in the research process, the relationships assisted flexibility in data gathering techniques and shared understanding of findings through dialogue and negotiation.

Case study

A case study approach gives an in-depth understanding of a situation and its meaning for those involved (Merriam, 1998). Many definitions of case study exist. This study fits within Yin's (1993, cited in Bassey, 1999) definition of a "descriptive" case study, designed to present a description of events within a context. It also accords with Stake's (1996) concept of an "instrumental" case study that refines theory or provides insight into an issue, and Stenhouse's (1988, cited in Bassey, 1999) definition of an "educational" case study concerned with enriching the thinking and discourse of educators. The present case study benefits from prior understanding of theory and literature to guide data collection and analysis (Yin, 1994).

Case study inquiry relies on multiple sources of evidence. Interviewing children, parents and teachers about the same topic had the potential for rich data that revealed similarities and differences in beliefs. Further data were obtained that enabled a comparison between beliefs and practices. A case study was appropriate for this research as it accounts for realism and naturalness in the context, and involves social and cultural processes (Kemmis, 1980). It is also appropriate for research in relation to curriculum and pedagogy as findings often relate more directly to practice than other research approaches and the results can be made accessible to the professional community. In relation to case studies, Stenhouse (1988, cited in Bassey, 1999) comments that "generalisation and application are matters of judgement rather than calculation" (p. 49). Tilemma (1997) noted that teacher beliefs identified through research ought to be disseminated for debate, and that beliefs are more likely to be linked to action when they are shared with others.

The research setting

Early childhood education is characterised by a diversity of curricula approaches offered in different settings. The setting chosen for this present study was one New Zealand public kindergarten. The government partially funds this service, with the balance met by parent donations and fundraising. An umbrella association manages this kindergarten. Kindergartens employ fully-qualified teachers and provide half-day sessional programmes for three and four-year-olds. The group size is either 30 or 45 children per session and the teacher-child ratio is 1:15. The role of the teacher is seen as supporting or guiding children's learning in a richly-resourced environment. Kindergartens usually enjoy significant parent support and input. Those in this association value regular excursions as part of children's curriculum experiences.

The kindergarten that participated in this project employed three teachers for the 45 four-year-old children on the roll for the three-hour long morning sessions. It was located in suburban Auckland on council reserve land. The local community comprised largely middle to upper-middle income earners. At the time of the research, the roll was made up largely of Pakeha/European children. The following ethnicities were also represented: South African, Māori, Korean, Chinese, Japanese, Indian and Indonesian. The majority of children lived in two-parent families.

A child-initiated, integrated, play-based curriculum was offered for the majority of the session time. An extensive, undulating, outdoor play environment with a large sandpit, swings and climbing frames was available to children. This area was supplemented by teachers' provision of additional equipment. Pulleys and ropes in the sandpit, ropes and abseiling gear for the slide, and dramatic play props were among examples observed. Paint, fingerpaint, water and carpentry were also available outside every day. The indoor environment was also large and well-equipped. Painting, collage, screenprinting, drawing and writing materials, dramatic and family play equipment, blocks, mathematics games, puzzles and books were all displayed at the children's level for them to choose from. Children selected their own resources and materials and used nearby tables and chairs as required. Crackers, fruit and water were available throughout the session. Children also accessed this of their own volition.

At the beginning of four sessions during the week, a small group teaching time occurred for 15-30 minutes. The commencement of small group teaching coincided with the beginning of the participant-observation period of the study. Each of the three teachers had fifteen children in her group. Teacher-planned, focused interactions occurred during this time. Children were invited to contribute ideas for learning and teaching experiences for these groups. There was an expectation that children would actively participate in these groups and most children did so willingly. At the end of each session, the whole group of children gathered together with two teachers for 10-15 minutes to share stories, music and action songs, and events from children's home lives. This session was referred to as "mat-time". It was also sometimes used to impart information to children, for example, about safety matters.

Curriculum planning and evaluation occurred on a three-week cycle. Three focus children for each teacher for each sessional group were identified, consistent with the child-centred approach to curriculum defined earlier as meaning that individual children are the focus of curriculum, programme and pedagogy. The teachers undertook observations of these children over the three-week period. At the next meeting, these children were assessed in relation to *Te Whāriki* and individual goals and plans were developed. These were incorporated into a group plan that integrated *Te Whāriki's* strands and goals. At the third meeting in the cycle, these plans were evaluated. Each cycle therefore, nine four-year-old children are being observed and a further nine children are a focus for teaching interactions (i.e., 18 of the 45 children on the roll). The researcher attended planning and evaluation meetings for two cycles that occurred during the period of the study.

The participants
Parents, children and teachers are among the groups whose views have previously been sought as stakeholders in early childhood education services. Participants from these three groups consented to partake in this study. The three teachers, Kate (the head teacher), Shaina and Mary (all pseudonyms), are all degree-qualified, a factor previously identified as promoting quality early childhood education (White, K., 1993), and range in experience from a beginning teacher to ten years' experience. They began working together as a team in this kindergarten only three months prior to the researcher joining them.

Of the 45 possible children, consent was gained from their parents to approach 14 four-year-old children attending the kindergarten. Thirteen agreed to participate. Nine children of the thirteen, whose parents were also participants, comprised the children's group who engaged in the group interviews with the researcher during the study. One parent subsequently dropped out of the study, but her child remained in the children's group. The other children who had agreed to participate informed the research through the researcher's observations of and participation in learning and teaching interactions.

Eight out of the twelve parents accompanying the excursion, all mothers, participated. The parents who participated knew their individual children well and were clearly interested in their children's learning and progression. Parents who participated were either full-time parents, or worked or studied part-time.

The excursion

At this kindergarten, an excursion venue was selected on the basis of one or more children's identified interests each term (i.e., there are four excursions undertaken each year). The research had no influence on the choice of the excursion venue, Kelly Tarlton's Antarctic Encounter and Underwater World. This is a tourist venue in central Auckland with two main attractions: the Antarctic encounter where penguins are viewed in a simulated natural habitat, and an aquarium with a viewing tunnel. It is this latter experience that gives the attraction its "Underwater World" title. Sea creatures are in a large aquarium above a see-through glass tunnel. People stand on a travelator to travel through this tunnel and view the creatures. The impression is of being within the aquarium itself as creatures swim directly alongside and above the glass tunnel. The name and brief descriptions of the creatures are included on small well-lit boards at regular intervals.

The teachers chose this venue for the excursion as several children had demonstrated a prior interest in sea creatures. In particular, two children had previously enacted through dramatic play a prior visit to the place of the excursion and also demonstrated significant knowledge of sea creatures. One of these two children was one of the nine focus children of the first curriculum planning and evaluation cycle during the period of the research. However, the excursion did not dominate curriculum planning or experiences and interactions. Therefore, while it provided a vital means of generating data, it did not exclusively dominate the study.

During the first three weeks of the study, several preparatory experiences for the excursion were offered to children. Small group teaching sessions included reading a story about an aquarium, discussing and drawing pictures of sea creatures, including those likely to be seen on the excursion, and discussing feeding fish and going fishing. Fiction and non-fiction books were available to children to read and initiate further discussion and questions with adults. Children's prior knowledge of sea creatures and their expectations of the excursion were sought. These provided evidence of children's knowledge and the subject knowledge adults required in order to support learning in relation to this excursion.

The excursion occurred on the Friday at the end of the fourth week of the study. The children, teachers, parents and researcher travelled by bus to Kelly Tarlton's. At Kelly Tarlton's, children first saw a puppet show, incorporating catchy songs that introduced them to the sea creatures they would see. Children were then given an opportunity to observe and hold turtles. The group then proceeded to the "Antarctic encounter", and travelled in mechanical "snow cats" (like a train carriage) around a track to see penguins, including recently-born baby chicks, a mechanical orca whale and seal, and to experience a simulated snowstorm. From there, the group progressed to the glass viewing tunnel in the "underwater world". Most children and accompanying adults went around the tunnel twice. The complete journey takes about five-ten minutes. To conclude, the group went to an education area. Children could handle starfish in a rock pool and saw at close range an octopus with its tentacles climbing the glass of its tank. After two hours at the attraction, the bus was boarded to undertake the return journey to the kindergarten.

The week following the excursion included a range of follow-up experiences. Small group sessions involved discussion, recall and drawing opportunities and experiences that incorporated early literacy. A video player was brought in and a video on sharks played. One corner of the kindergarten was draped in blue and white materials for children to engage in dramatic play and to display their drawings and models of sea creatures. Children found plastic sea creatures in a container that they played with to re-enact their excursion experience and reinforce knowledge of identification of species. The books were still available and the non-fiction ones were browsed more frequently. By two weeks after the excursion, most children's interest had been exhausted and other interests were more prominent in the planned and spontaneous experiences.

Ethical considerations

Case study research is grounded in a real life context and can be intense. Negotiated permission based on respectful relationships is required. In this study, the ethical principles of voluntary participation, informed consent and minimising harm were considered, particularly in relation to children's participation. The study conformed with Massey University's code of ethical conduct and was approved by the Massey University Human Ethics Committee.

Ethical research with adults

In the present study, permission was first sought from the kindergarten association. A kindergarten identified by the association management as suitable for participation in this project agreed to be approached. A letter and an information sheet (appendix 1) were sent to the teachers. Discussion then occurred at a meeting between the teachers and the researcher at the kindergarten. As a result, the teachers agreed to participate. However, two were still initially anxious, particularly the newest graduate teacher, Mary. She was reassured that the research was not designed to criticise her teaching. The teachers were also informed that they had the option to withdraw at any time.

Aldridge and Wood (1998) undertook a survey of professionals who interview children. They suggested that for interviewing children less than eight years of age, more time than with older children must be spent building rapport. This further supports the approach taken in this study to build relationships and rapport with children and adults well in advance of conducting the actual research. Two weeks were allowed for becoming familiar with the setting and routines of the teachers, parents and children and developing rapport. At the end of the first week, feedback was sought to ensure the researcher had not unknowingly acted inappropriately at any point. Mary's feedback was "It's just like having a fourth teacher". Kate commented at the conclusion of the research that this settling-in period had been very important to them to become comfortable with both the research process and with the researcher as a person (see also Billman, 2002). This period of time also enabled Mary and Shaina to relax and overcome their initial anxiety.

Parents and children were informed of the project by an introductory letter about the study (appendix 2), which included an information sheet (appendix 3). After informed consent was obtained from teachers (appendix 4), parents (appendix 5) and children (appendix 6),

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the place and time of the focus groups was negotiated with each group. The familiar environment of the kindergarten was chosen as a suitable venue and the focus groups occurred during session times for the parents and children, and during non-contact afternoons for the teachers. Consent sheets were collected prior to the first focus group. The adult focus groups also discussed confidentiality issues and an appropriate process for verifying group transcripts. A protocol for access to artefacts involved in curriculum planning and evaluation was negotiated with Kate as the head teacher.

As participants were likely to be able to recognise others' contributions, it was therefore not possible to guarantee anonymity to the teachers and parents. However, confidentiality was appealed for. This was acknowledged when consent was obtained and confidentiality agreed to in a signed group contract (appendix 7). No questions were asked of teachers or parents that suggested a likelihood of dissatisfaction with the curriculum or programme being offered. This research was not intended to create unease or dissatisfaction and therefore adversely affect participants or the kindergarten.

Flinders' (1992) relational ethical theory was considered during the data gathering, analysis and reporting procedures. This theory emphasises caring and respect and the importance of an ecological basis for decisions. Participants are collaborated with, fieldwork avoids making any impositions and the participants confirm reports. After the data gathering and analysis were completed, the researcher later returned to the kindergarten to discuss the findings with the teachers and ensure that they were given opportunities to consider reasons why beliefs and practices diverged.

Involving children in research in an ethical manner
Parents' consent to approach children was sought first, followed by the children's consent being sought. In no instance was proxy consent from parents used to obtain children's participation. Once rapport was established, the project was discussed verbally with children at the kindergarten. The explanation was that the children were going to learn about sea creatures, go on a trip to see some, and then would talk about the trip and what they learned afterwards. The children were asked if they would let the researcher watch them with their friends and the teachers, take photos, write stories about them in a notebook and tape-record discussions. With regard to confidentiality, children were told

that what was discussed would be private to them and their parents (the latter to assist verification) and that they could choose their own pseudonyms.

In the case of young children, the ability to give consent is problematic, but is possible (Hughes & Helling, 1991). Young children's ability to give consent rests significantly on the efforts of the researcher. The Massey University Human Ethics Committee initially queried the necessity of gaining the consent of children under seven years of age. The processes involved in the subsequently approved written consent form were consistent with both approaches to educating children about consent to participation in research (David, Edwards & Alldred, 2001) and participation in early literacy practices consistent with sociocultural theory (Göncü & Katsarou, 2000). The four-year-old participants demonstrated a wealth of early literacy knowledge as they completed the consent sheet. Making an attempt to write and sign their name was an important way of them being respectfully and actively involved in the research process. The refusal of one child to participate in the study vindicated the decision to obtain children's consent.

Further, interviews with the children were organised to avoid disruption to the normal learning and teaching programme, and occurred during the small group time at the beginning of each session. The place and process of the interview was negotiated with them. The children agreed anyone could speak when they wanted to and monitored each other's turn-taking at times. Pseudonyms are used throughout the reporting of results and the discussion. The children chose the name of the group and their own pseudonyms. The children named the interview group collectively "the penguins and sharks", consistent with the other three small groups' names at the kindergarten being animals and the research using the excursion as a framework. This was also likely to have influenced their choice of personal pseudonyms largely as names of sea creatures and animals.

The presence of the researcher
The researcher felt comfortable with the philosophy and practices of the research setting and adopted the role of a "complete participant" (Gold, 1958, cited in Merriam, 1998) in terms of acting as a teacher. The mix of participation and observation changed from the third week on, when more detailed recordings were made of learning and teaching interactions. The teachers became more comfortable about being observed with children. Few children commented on the notebook used to record fieldnotes as they were familiar

with teachers writing observations; those that did accepted the explanation that the researcher was writing stories about their learning at kindergarten. During participant-observation interactions, no child was excluded from spending time with the researcher on the grounds that they were not research participants, nor were any data recorded on non-participant children.

Nevertheless, in practice, the researcher role created some confusion and ambiguity for parents and children. Parents and children both commonly took the role to be that of another teacher. For example, parents sometimes approached the researcher initially with information about another person picking up their child that day or concerns about children's progress or friendships. Ongoing communication and negotiation was necessary with the parents and teachers, particularly Kate, to address this at times. The children were especially vulnerable, commonly unable to distinguish between the teacher and researcher roles. The children, including those in the research group, clearly saw the researcher as a teacher after the first two weeks. As the researcher took on responsibility for some preparatory experiences during the interviews, this confusion was understandable. Only two children in the kindergarten, Penguin 2 and Starfish, gave any indication that they knew the researcher did not quite fit the organisational systems the teachers operated under. Penguin 2 described the researcher as the "inside-outside teacher", recognising that the researcher was not subject to the organisational constraints of the kindergarten teachers in terms of duty areas. Yet in other interactions, they, too, surmised that the researcher was a teacher.

> *Starfish asks me to turn the hose on and I say I'll need to check with a teacher. She*
> *says "But you are a teacher. You teach us things." (fieldnotes)*

While the literature recommends gradually easing out of the setting, Kate felt that children's experience of child peers and long-term visitors was that they attended intensively and then exited with the knowledge of children. Therefore this form of exit from the period of participant-observation occurred in this research.

In any study where the researcher spends a length of time in the setting, the impact of the researcher on the setting and the research itself requires consideration with regard to the validity of the findings. Such consideration is also consistent with Hughes' (2001) claim that researchers also have a responsibility to explain and make sense of their own actions

in interpretivist research. The possible impact of the research on teachers' practice, and therefore on the study, is discussed in chapter four in relation to the findings.

The potential disadvantages of a complete participant approach that may affect the study's validity are to become an "insider" and lose perspective, and for the research participants to feel let down by any negative findings. However, the teachers understood the purpose of the researcher's presence and role. Both the researcher and the teachers knew that the presence was for a limited period. While a friendly and collaborative relationship was established, it always remained professional, with clearly enunciated boundaries. In this way, researcher effects were minimised (Miles & Huberman, 1994).

Data gathering techniques

In this study, seven weeks were spent in the research setting gathering data. Focus group interviews were the primary data source, supported by parent and teacher diaries (notebooks were provided for this purpose), curriculum documentation, and researcher fieldnotes recording observations of learning and teaching interactions (see figure 3.1, p. 58). Use of group interviews as a research technique to ascertain teachers', parents' or children's beliefs appeared rare in previous studies of beliefs.

Focus groups

Two one-hour interviews were conducted with teachers and parents, one pre-excursion and one post-excursion. The parents' interviews took place in the teachers' office during the morning while their children were at the kindergarten. The teachers' interviews took place during afternoons during the non-contact time they have two afternoons a week. The children in the research group spent their small group teaching time with the researcher for two weeks, one prior to and one following the excursion. Four interviews of ten-fifteen minutes occurred each week.

Focus groups were considered appropriate for this research for a number of reasons. The group interview reduces the common criticism that the researcher's presence or actions may influence the answers of participants. The role of the researcher becomes one of group facilitator rather than interviewer (Watts & Ebbutt, 1987). Moreover, in comparison with individual interviews, focus groups allow more flexibility as to the order and flow of discussion as themes develop. The interview was guided more by a list of questions or

Figure 3.1 – Summary of Research Procedures

Prior to study	➤ Ethical approval for study obtained from MUHEC ➤ Permission gained from kindergarten association to approach a kindergarten for the study ➤ Meeting with teachers to explain study and invite participation

Week one	➤ Participant-observation began in kindergarten, initially to build relationships and knowledge of setting (recorded in fieldnotes)

Week two	➤ Participation invited of children and parents; informed consent gained of all participants ➤ Observation of learning and teaching interactions recorded in fieldnotes

Week three	➤ "Small group time" spent with children to ascertain prior knowledge ➤ First focus group discussion with teachers ➤ Curriculum planning and evaluation meeting attended

Week four	➤ "Small group time" used to interview children ➤ First focus group discussion with parents ➤ Parents and teachers wrote diary entries of children's questions and conversations ➤ Excursion undertaken to Kelly Tarlton's Antarctic Adventure and Underwater World

Week five	➤ Learning and teaching interactions observed for links between beliefs and practices ➤ "Small group time" used to interview children ➤ Second focus group discussion with parents

Week six	➤ Individual and small group interviews with children ➤ Second focus group discussion with teachers ➤ Curriculum planning and evaluation meeting attended

Week seven	➤ Participant-observation in kindergarten concluded

issues to be explored in an un-predetermined order (appendix 8). In the pre-excursion interview with teachers and parents, beginning questions occurred about general issues to do with the kindergarten, teaching and the excursion, and then narrowed in to the topic of subject content. This is referred to as a "funnel design" (Morgan, 1997, p. 65). Using a guide allowed the researcher to respond, probe and explore emerging viewpoints expressed, rather than be restricted to a fixed order of questions. During the post-excursion interviews, parent and teacher diaries and photographs were used to stimulate recall with teachers and parents, and the photographs were similarly used with the children.

While advice indicated that the optimum size for a focus group is 6-10 participants (Morgan, 1997), there were only three teachers employed in the setting so this determined the teachers' group size. The number of parents and children willing to take part in this study determined the size of their focus groups and fell within the suggested range. However, in practice, it was difficult to enable all nine children to experience genuine opportunities for participation in one group. Children's consent was re-negotiated to undertake individual or small group (two or three children) interviews with them after the excursion. This was more successful as children had more opportunity for extended contributions. Homogenous focus groups were chosen because this topic could be considered controversial or have potential for disagreement or conformity among participants if mixed groups were used. It was also likely that children may not have a strong presence in mixed groups. For parents, teachers and children, interest in sharing and listening to others' views occurred.

Secondly, the potential of group interviews for revealing the ways knowledge is constructed socially and human beings share and negotiate understandings was considered a technique consistent with sociocultural theory. Likewise, some researchers advocate less emphasis on dyadic teacher-child relationships and greater attention to children's voices in peer groups (Cullen, 1998a; Singer, 1996), supporting a group interview approach.

Literature about conducting interviews with children (Aldridge & Wood, 1998; Gollop, 2000; Mauthner, 1997; Tammivaara & Enright, 1986) is plentiful. However, Scott (2000) notes that there is little guidance in the literature about conducting focus groups with children. The first two interview sessions were fortunately intended to orient the children to the interview situation. Discussions about pets, favourite teddies and television

programmes and requests to listen to the tape, instead of responding to questions asked about their kindergarten experiences, were frequent. Considering whether or not to control a discussion with children for the research purposes or to acknowledge the children's lead was a dilemma, as philosophically the researcher did not want to exert power or influence the children.

The lead-in time proved however to be a successful strategy. During these initial interviews it is likely that the children were establishing their power within the research situation. These interviews also allowed time for the "talk of many things" (Robbins, 2001, p. 11) appropriate in following a sociocultural approach to interviewing children. These contributions from the children about their lives, interests and families offered much useful information about their prior knowledge and interests that perhaps further enhanced the research relationships and findings. By the time the children's focus groups began discussing issues relevant to the research, children were more comfortable and familiar with the interview process and the group relationship.

During the group interviews, aspects of young children's language and memory capacities also needed to be taken into account. Children's contributions were often repeated back immediately to enable children to correct any misunderstandings. The researcher also probed carefully at times to ensure that responses were understood.

Parent and teacher diaries

Konzal (2001) used parent diaries as a technique in ascertaining parents' understanding of their children's learning and perceptions of the kindergarten experience. Diaries were used as a tool in this study to access additional data otherwise unavailable to the researcher (appendix 9). Parents and teachers were asked to keep diaries between the two focus group discussions. The excursion occurred in the middle of this period. The adults were asked to record children's conversations, and questions and answers, with any adults and children at home or at kindergarten that related to the excursion.

Fieldnotes

Each day of the seven week participant-observation period, fieldnotes were recorded of observations of small group teaching sessions and informal teaching and learning interactions (appendix 10). The fieldnotes recorded teachers' practices and children's

interests, knowledge and learning experiences related both directly to the excursion and revealed in spontaneous interactions. Observations of peer interactions between children were also included. Notes were recorded about the research participants, and verbatim conversations between children and between teachers and children. Impressions of events that occurred were also documented, such as the curriculum planning and evaluation meetings, reactions to comments and events, initial thoughts and interpretations and questions to follow up on later.

Curriculum documentation

A range of documentation was collected. Curriculum planning and evaluation evidence was gathered (appendix 11), evidence of children's learning such as photocopies of drawing and writing, and relevant sections of Orca's portfolio were photocopied (with permission gained from him and his mother). Photographs were an additional source of documentation of children's learning related to this excursion. Other documentary evidence included newsletters to families, including one about the excursion, and material related to the parent help role.

Validity and reliability

Research should be judged in terms of its success in investigating the problem under study. In research, validity is about its truthfulness and reliability about the trustworthiness of the data collection and analysis processes. An interpretivist approach suggests that knowledge is valid if it is authentic, that is, the true voices of the research participants. However, in the present study, several data gathering techniques were also used as a conventional means to assist and validate interpretation of research findings. Beliefs expressed were compared with observations of teaching practice, learning and teaching interactions, and curriculum planning and evaluation documentation. In this way, the research demonstrated internal validity. Explanations of assumptions and theory underpinning the study, and justification of results and conclusions also assists reliability, or consistency in findings.

In other words, validity and reliability occur within the research, from both truthfully reporting the participants' perspectives and multiple data that support findings, rather than through similar or follow-up research as occurs in quantitative studies. Further, existing theories of teacher knowledge were applied to the present study to explore their construct validity in early childhood education.

Triangulation

Triangulation is the term given to investigating a research problem from different viewpoints to assist validity and reliability. Hughes (2001) suggests that because interpretivist knowledge is unique to a specific study and participants, that triangulation is not necessary. However, Flick's (1998) view of triangulation in interpretation as the seeking of convergence, and added depth or richness through the use of complementary data gathering techniques has been used in the present study. The teachers', parents' and children's beliefs identified in this study are interpreted alongside evidence from other data sources, such as observations of teaching practice in the kindergarten, parent and teacher diaries and curriculum documentation. The observations also assisted knowledge of the context and provided specific incidents that were discussed during the second adult focus groups.

Generalisability

The potential limitations of a case study approach are that the researcher chooses the material for study and reporting, it may be difficult to validate findings, generalisation is not always possible and the value of single study events can be questioned. While the methodology of the present study could be replicated, the findings would be unique to the new research setting. However, not all writers see generalisation as an essential or even possible outcome of case studies (Merriam, 1998; Stenhouse, 1988, cited in Bassey, 1999). Others suggest that because a case study allows deep investigation and intensive analysis, that generalisation to the wider population is possible (Cohen & Manion, 1989) and helps build theory.

Transcript verification

Children were familiarised with the taperecorder prior to the recording of their interviews. The researcher transcribed the children's interviews and another person not associated with the research transcribed the adults' tapes. The participants were provided with transcripts of their interviews for verification purposes. Parents were asked to read the children's transcripts with them. Some clarification and minor corrections and changes resulted from this verification process.

Methodological constraints

Constraints related to the methodological approaches used in this study and to children's participation impacted on both the process of data generation and the interpretation of findings. These are described in the following discussion.

Bias

An interpretivist study is based on participant perceptions. Participants' perceptions can be subject to bias, perhaps based on their motivation to be involved in the research. These perceptions are then subject to the researcher's bias during the interpretation. The researcher's strong interest in this topic due to teaching experiences in the secondary sector was a declared bias. However, in the present study, the research questions and data obtained from participants were related to existing research on both subject knowledge and teacher beliefs. Issues of validity and generalisability have been attended to, and the interpretation of the data has been subject to scrutiny and supervision to reduce the effect of bias.

Further, group interviews diminished the potential to influence the data by reducing the researcher's role to that of a facilitator. This role was to guide the conversation rather than influence and participate in it, which lessened the effect of any bias. Similarly, triangulation achieved through comparison of beliefs and use of supporting documentation and evidence helps to minimise the effects of bias and interpretation. The study has had close supervision to ensure that possible alternative interpretations and explanations of the data have not been disregarded. Moreover, the teachers and one parent were given the opportunity to respond to interpretations of the results when they were in draft form. This also ensured that participants contributed to the meaning-making of the research.

Children's metacognitive abilities

In the present study, the interviewing strategy relied on children's ability to recall their learning experiences and reflect on teacher knowledge. However, children found recalling favourite self-chosen kindergarten activities difficult until photographs were used as a recall item. It appeared this was not an issue related to the research as parents commented that children did not readily recall session activities to parents when children were collected from kindergarten each day. Only three children demonstrated the ability to express understanding and beliefs about their learning and knowledge. This may perhaps

suggest that children have had limited experience in reflecting about their learning and is consistent with metacognitive constraints described by Sheridan and Pramling Samuelsson (2001) in their study of children's participation and decision-making in the curriculum they experienced.

Due to technical difficulties, a time delay occurred before conducting the children's post-excursion interviews. This was crucial for some children's recall. Some events children recalled during small group times and spontaneously during sessions the week after the excursion, which corresponded to entries in diaries kept by teachers and parents, were unable to be recalled during research interviews over the next two weeks. There were two notable exceptions. Penguin 2 recalled the event and her learning from it, and continued to initiate questions and discussion with adults long after other children had moved on to other interests. Orca's recall of the excursion remained detailed and consistent three weeks following the excursion.

This contrasted with Hamond and Fivush's (1991) finding that children demonstrated significant memory abilities after a long period of time. According to Aldridge and Wood (1998), the likelihood of inaccurate reporting of events increases over time in relation to children's cognitive capacities of time and memory. It could be argued that this may depend on what it is children are being asked to recall and how often this knowledge has been re-visited prior to recollection. Aldridge and Wood's research indicated that although children have good memories for events they have personally experienced, they benefit from support to facilitate their narrative accounts. Questions, probes and photographs were used successfully as stimulated recall items in this study. Furthermore, the two children who recalled the most were those who had visited Kelly Tarlton's previously and were building on previous knowledge. This lends support to DeMarie's (2001) findings that previous visits improved recall.

Data analysis

An interpretivist approach generated rich data. Interpreting the data from focus groups involved the researcher "distinguishing between what participants find interesting and what they find important" (Morgan, 1997, p. 62). Teachers and parents expressed clear beliefs about subject content knowledge. Yet the focus group data also revealed that beliefs were more complex than discussion of just subject content per se. Beliefs about

subject content were also embedded in discussions about knowledge, pedagogy, curriculum, children and the kindergarten context. Children's beliefs, thinking and knowledge were ascertained both explicitly in the interviews and also implicitly through their interactions. Examining fieldnotes for evidence of implicit beliefs was therefore undertaken.

In the present study, data analysis and presentation of findings therefore draws across all data sources: focus group interview transcripts, fieldnotes, diaries and curriculum documentation. The interviews are employed largely without distinguishing between them as pre- or post-excursion, as commonly the second interview explored and reflected on issues raised in the first in more depth. In presenting results, direct quotation of the participants is used to give them voice, a hallmark of validity in interpretivist research (Hughes, 2001). Parentheses are used where the researcher has inserted words for the purposes of explanation or clarification. Excerpts from the fieldnotes provide evidence and examples of beliefs and practices. Parent and teacher diaries and curriculum documentation furnish further supporting evidence for beliefs and practices from the teachers', parents' and children's perspectives.

Frameworks for data analysis

Two frameworks are utilised to analyse and explain the beliefs expressed and the practices observed: models of teacher knowledge and sociocultural theory. Interpretation of the study's findings through two frameworks assists the study's ability to be examined by both the research community and experts of the disciplines or fields under study, in this case, early childhood education and teacher education.

A significant amount of prior research into teacher knowledge has developed theories that group types of knowledge into categories. To this end, a systematic analysis of key ideas with regard to categories of teacher knowledge was undertaken to explore their relevance to the data. Themes corresponding to these key ideas emerged from the researcher's examination of the data. These themes were utilised as theoretical principles to collect together relevant findings. The interview transcripts were then coded in relation to these key themes (see appendix 12). These were summarised (appendix 13) and sent to the parents and teachers. Feedback indicated that the summary was accurate and no modification of this summary occurred before the detailed report of the study was written.

Analysis of the findings in this way was also discussed with the teachers to further ensure researcher interpretation was valid. Some modification to chapter four occurred as teachers assisted clarity of interpretation. Some meaning-making therefore took place with the participants. The conceptual framework of teacher knowledge is described and used as one approach to analyse and interpret the study's findings in chapter four.

As noted earlier, the interpretivist researcher's task is to understand socially-constructed, negotiated and shared meanings (Hughes, 2001). The data contained many examples of knowledge constructed in social interactions, ways that participants shared and negotiated meaning and ways participants' understandings were collaboratively constructed. Consequently, the data was further analysed through the lens of sociocultural theory, considering key concepts of socially-constructed learning and the applicability of concepts of learning communities (Rogoff et al., 1996; Wells, 2001a; Wenger, 1998). A sociocultural perspective was found to further illuminate the position of subject content knowledge and learning in early childhood education. Sociocultural theory is used therefore as the conceptual framework for presenting and discussing the results in chapter five.

Summary

This chapter has explained and justified the interpretivist approach adopted by this research to generate data with which to examine beliefs about subject content knowledge in early childhood education. This approach is consistent with the research design and methodology, and the theoretical underpinnings of the study. Data gathering and analysis procedures have been outlined. Ethical principles and ways in which validity and reliability were assisted have been discussed in relation to this project. The setting and participants have been introduced. In the next two chapters their voices will be heard and their beliefs and practices revealed, as the findings of the research are described and interpreted.

Chapter Four

RESULTS: CATEGORIES OF TEACHER KNOWLEDGE

Conceptual framework

Chapter four describes the research findings from the perspective of teacher knowledge. The aims of this project were to explore beliefs about subject content knowledge held by teachers, parents and children involved in early childhood education, and to identify links between beliefs and curriculum and pedagogy in relation to subject content knowledge. The data revealed that beliefs about subject knowledge were more complex than subject content per se. Beliefs were also embedded in discussions about pedagogy, curriculum, children and the kindergarten context. Therefore, a more elaborate conceptual framework than subject knowledge alone became necessary to present the complexities and multiple perspectives of the participants.

Categories of existing models of teacher knowledge were examined for relevance to the data (Grossman, 1990; Shulman, 1986; Wilson, Shulman & Richert, 1987). To explore the beliefs, the following themes were effective in explaining the findings: subject content knowledge, knowledge of pedagogy and philosophy, knowledge of learners and knowledge of context. These themes were therefore used as a conceptual framework and explored for their construct validity in early childhood education.

Curriculum is viewed in this chapter as an overarching and all-encompassing construct in which the four themes are embedded. This is consistent with Bruner's (1960) view of curriculum as incorporating subject knowledge, knowledge of learners and the process of gaining knowledge. It is also much broader than a potentially narrow and limiting view of curriculum as content that has perhaps fuelled the arguments of critics in the early childhood sector who have denied that subject knowledge has a place in early childhood curriculum and pedagogy.

The beliefs expressed by the participants are discussed in relation to each of these themes. Links to teaching practices in relation to curriculum and pedagogy are also discussed within each theme. Triangulation of data sources assisted in identifying where beliefs and practices matched and diverged. (See also table 4.1, pp. 104-106).

Subject content knowledge

Subject content knowledge has been defined as the factual and conceptual knowledge required for teachers to accurately convey information or explanations. In this study, the beliefs expressed divided further into general and specialised content knowledge. These are presented separately in this discussion of subject content knowledge. Kate developed this distinction in her thinking during the first interview.

> *Kate - To me, there is an expectation that you do have an understanding of (for example) the elements of art.*
>
> *Researcher - Who has that expectation?*
>
> *Kate - I guess I do, as a teacher, I expect myself to have that. And I expect myself to have skills in science as well, ... And just everyday sort of things, questions that are going to be asked. ... I think there needs to be that understanding of ... the basic elements of everything.*
>
> *Researcher - And when you say everything are you talking about subjects?*
>
> *Kate - Science, subjects, (yes), subjects. ... Specialised knowledge is something ... extended on from general knowledge, because it is an area... for example sea creatures, ... we had to have (specialised) knowledge of a specific area, as opposed to just general knowledge over a broad range of topics.*

One parent summed up a belief expressed by several parents.

> *Jo - Mums or teachers don't have to know everything, which lets them (children) know that ... they don't have to know everything as well.*

The teachers supported this in their views.

> *Mary - I mean do you think we need to have specific subject knowledge?*
>
> *Kate - (Yes) I think you need to.*
>
> *Mary - But we couldn't about everything, could we?*

Among the parents, Sue noted that adults need to be *"an encyclopaedia almost"*, while Jo felt that adults needed *"just a reasonable general knowledge"*. Teachers' views were in accord. Kate stated that teachers need *"a very broad knowledge base"* with Mary immediately in support, *"very broad"*. Kate further defined this base as *"a good broad science knowledge, maths knowledge, how the world works, nature and the earth"*, demonstrating subject distinctions in her definition.

The researcher asked where the teachers had learned subject knowledge.

> *Researcher - And where do you get that from? Did you get that in your teacher*
> *education?*
>
> *Kate - I think from life, really and from early education, like from primary and*
> *secondary school.*
>
> *Mary - I just found at (teachers') college, a lot of it was very, almost too broad. I*
> *think a lot of things that we did, was just like a smatter. So in some ways I feel like I*
> *came out with subject knowledge, ... but not so much specific knowledge.*

As previously noted, it is unlikely that all early childhood teachers can have sufficient broad knowledge to engage in spontaneous teaching during all "unreturning moments" (Meade, 1997, p. 36). This is perhaps reflected in the beliefs of the teachers in the present study that accessing specialist knowledge was important. Where teachers did not have answers to questions that occurred during spontaneous teaching, it was thought it important to follow up with the child.

> *Kate - We can show children that we need to find things out too, and that learning*
> *with them comes back to their partnership, and let's find out together.*

Teachers' and parents' views suggested that general knowledge was considered the kind of knowledge required for daily living and generally expected to be known by adults of the society and culture. Specialised knowledge was the kind of knowledge that may need to be studied or accessed to meet specific learning needs. In this study, specialised knowledge related largely to the excursion. This fundamental distinction was useful in the explanatory framework of the present study. The nature of knowledge in more complex frameworks, for example, from universal to unique domains that incorporate increasing depth of discipline-based subject knowledge (Feldman, 1980, cited in Lambert & Clyde, 2000), and the complexities of cognitive knowledge itself are acknowledged, but not explored in the scope of the present study.

General knowledge

Children revealed their general knowledge of the world in their spontaneous child-initiated interactions and in the interviews. For example, a number of conversations occurred about how the group would be transported to the excursion venue. These conversations illustrated that children's subject knowledge is not discipline-specific, crossing the

boundaries of literacy, mathematics, geography and technology. Penguin 1's brother had asked her the day before the excursion if she would be going on a bus with "kindy" written on it. Her response was *"No, buses don't say that, and they have numbers"*. In the children's interview there was discussion of how the bus driver would know how to get to Kelly Tarlton's.

Researcher - How are we going to get to Kelly Tarlton's?

Frankenstein - On a bus!

Researcher - Now I've got a question for you. How does the bus driver know where to go to get us from here at kindy to Kelly Tarlton's?

Penguin 2 - He knows how to get us on our street.

Researcher - Have you seen a bus on your street?

Penguin 2 - Mmm.

Researcher - So what does a bus driver use to help him find his way around?

Frankenstein - Map! A map!

Researcher - That's right Frankenstein. And I've brought a book of maps ... of Auckland. I thought that you might be interested in looking at that this morning because you're interested in maps.

Penguin 2 - Can you see where the mountains are because ... they are in the middle of the island?

Bunny - And I am interested in maps.

Researcher - No it's just of Auckland.

Both Frankenstein and Bunny proceeded to draw maps that held personal meaning to them.

Frankenstein - A map! Look! It's a map! Look!

Researcher - A map? Okay, so what's this map about?

Frankenstein - It's from my house to kindy.

Frankenstein and Bunny extended their prior interest in maps further. Frankenstein drew "treasure maps" and later wrapped parcels of collage materials to be found at the treasure sites. Bunny drew her map of the route to Kelly Tarlton's. She kept this to take on the excursion. One teacher, Mary, recorded a conversation that occurred on the bus with Bunny about her map. Bunny described the major landmarks passed and where they featured on her map.

Children's beginning knowledge of calculating time and duration was evident in the following two interactions. The first occurred prior to the excursion.

Puppy - I got a calendar.

Researcher - What's your calendar about?

Puppy - Tells us when things will be.

Researcher - What days you're going to things?

Puppy - Yes.

Researcher - And what day are we going to Kelly Tarlton's? (no response) You and your Dad were telling me that you've got a special calendar at home that's counting down the number of...?

Puppy - Sleeps! Seven sleeps to Kelly Tarlton's.

Orca - And there is two more sleeps until my birthday.

Researcher - Oh, a few more than that I think.

The second example occurred after the excursion.

Researcher - How long can (penguins) stay under water?

Penguin 2 - A very long time.

Researcher - ... I think it was about 20 minutes wasn't it?... Do you think we could hold our breath for 20 minutes?

Penguin 2 - No ... I just go under for five ...then I come up and take a breath.

Researcher - I don't know if you could even stay under for five!

Penguin 2 - I can! ... My swimming lesson teacher counts to five.

Researcher - I think that might be five seconds, not five minutes.

Penguin 2 - Mmm (puzzled frown on her face).

These examples of maps and time calculation illustrate examples of knowledge the children construct from their everyday experiences. In addition, much is the kind of knowledge they will need as adults for everyday life. Teachers' general knowledge can support and extend this learning through meaningful responses. Likewise, understanding gained from this data of children's conceptions of aspects such as time could enable teachers to consider and plan for ways to assist children's learning to become more accurate. For example, establishing the difference between seconds and minutes would assist Penguin 2's understanding of the greatly differing length of time she could hold her breath for in comparison with a penguin.

Children's prior knowledge has been established in existing literature as an important influence on new learning (Wellman & Gelman, 1992, 1998). In relation to the excursion, several children demonstrated prior knowledge of the excursion venue through previous visits with their families. Bunny revealed her experience of the travelator in the viewing tunnel.

> *Researcher - Bunny - you said you've been there before.*
>
> *Bunny - Yes.*
>
> *Researcher - So can you tell us a little about it?*
>
> *Bunny - Um I didn't saw any of the fish. All I was interested about ... was that thing that looked like an escalator but it was a slide.*
>
> *Researcher - It wasn't an escalator, it was a slide. Where was that?*
>
> *Bunny - But it can move in steps. It was at Kelly Tarlton's.*
>
> *Researcher - Right. So did you stand on the slide/escalator thing?*
>
> *Bunny - Yes and you and the slide moves.*
>
> *Researcher - And what do you see on it? What do you see while you're on it? ...*
>
> *Bunny - And that thing goes around. It was the only thing I was interested about.*
>
> *Researcher - And it goes around where?*
>
> *Bunny - It goes around it only goes around and you can see you can only see nothing.*

Bunny's mother confirmed Bunny's memory independently in the parents' interview.

> *Eve - We took Bunny two years ago, she wasn't interested really. All she was interested in was the escalators, going round and around and around.*

Bunny's interest in the travelator was in keeping with DeMarie's (2001) finding that some children may be more interested in environmental aspects of an excursion rather than the focus of the excursion experience. The complex learning and thinking that occurred for Bunny about the travelator was arguably just as valid as potential learning about sea creatures on that occasion.

Orca recalled his impression of what he saw on a previous visit in the viewing tunnel.

> *Orca - I saw a shark!*
>
> *Researcher - You saw a shark. What sort of shark was it?*
>
> *Orca - A goblin shark.*
>
> *Researcher - A goblin shark? What does that look like?*

Orca - Well, it had a long snout there and it turned around and was looking at me and its eyes all lighted up. Um, there is the goblin shark what I saw, there's a great white shark, there is a whale shark... .

Orca's knowledge of sea creatures is discussed further later in this chapter and Bunny's experience of the travelator and viewing tunnel on the kindergarten's excursion returned to in chapter five.

Specialised knowledge

One parent, Jo, was clear in her belief that teachers and parents should use accurate information to explain ideas to children, and suggested that learning and accessing knowledge was a teacher's professional responsibility.

Jo - I think there is no point in talking to children about things, particularly things ... that happen in nature, if you are not using the factual language that revolves around it. Children do actually take what teachers say, because they hold such a position of authority, they really do take what teachers say quite seriously. And I mean obviously if ... something comes up in play or discussion, that the teacher doesn't know, then that's perfectly acceptable, but that there should be some effort made at some point for that question or concept to be revisited in some kind of factual information offered to explain.

Within a sociocultural perspective, revisiting and extending on learning is an important contributor to children's growing understanding and knowledge construction.

Several parents felt that for an event such as an excursion, preparation was important.

Jo - If you are wanting them (children) to get the full benefit out of a particular trip, that some preparation of what they are likely to expect, without telling them everything that's there. To start them thinking along that ... track.

Preparation included adults taking responsibility for their knowledge.

Cara - At least to know what the fish are called.

This was supported by the children's beliefs about what teachers should know.

Penguin 1 - To know about what we're seeing.

Teachers' beliefs supported this view of preparation for the excursion, noting that adults needed knowledge of the different sea creatures that would be seen. Shaina explained:

You can't go somewhere and not have any idea about where you're going and ... what's going to be there.

Specialised knowledge, such as that related to this excursion, was seen as able to be researched by adults before being taught. Books, the Internet, television, signs at Kelly Tarlton's and the knowledge of other adults were identified as resources or cultural tools to assist learning. Parents and teachers agreed this research should happen prior to the excursion. Teachers and parents frequently extended their own knowledge by researching material based on children's interests.

In relation to one aspect of curriculum provision, Shaina stated that obtaining specialised knowledge prior to presenting science experiences to children was crucial:

> ... with science experiments. I can't just think of them out of my head (and) what chemical reactions do. You need resource books.

Jo's comment from the parent's perspective supported this.

> And certainly if (teachers) are going to be setting up experiments of any kind that they should be able to explain in a reasonably factual manner, what it is that they're doing.

Expressing beliefs about subject content appeared to be a metacognitive task few of the children were yet capable of. Children revealed their beliefs that subject knowledge was important indirectly, through their desire to share their knowledge with adults and peers. For example, Kitten had wide knowledge of and interest in cars, raising this during the initial interviews.

> Kitten - I know all of the cars' names.
>
> Researcher - Yes. So what sort of cars do all the children come in to kindy?
>
> Kitten - Penguin 3 takes a Cherokee, eh Penguin 3? (no response) And I know what your car's called, your little one, a white one, I know Mary's car, I know your car - a Rover.

Orca's and Penguin 2's focus on types and species of sea creatures, discussed later in this chapter, and Kitten's on car makes, features and characteristics are examples of these subject-related interests.

This section has revealed the beliefs about the value of subject content knowledge held by the teachers, parents and children. The next section examines how these beliefs were acted on in teaching practice.

General knowledge in teaching interactions

Teachers acted on their belief that general knowledge can be used to guide children's learning during teaching opportunities. During some spontaneous interactions, general knowledge was offered. In the following example, the children have discovered a dead bird. The children were interested in the state of its body, how it may have died, and how to give it an appropriate burial. Kate contributed knowledge, while also encouraging children's thinking and knowledge through careful listening.

> *Kate "What does he feel like?" Frankenstein "stiff, cold." Kate (gentle, respectful tone) "I think we need a nice warm box for him ... Can you see how the body's gone all stiff? That's what happens when you die - your body goes all stiff. ...When people die, we put them in special boxes too." ... A new child joins the group and asks how the bird died. Kate "We don't know how he died." Penguin 1 "Maybe he didn't have any food." Starfish suggests the bird banged into a tree. Penguin 1 "Maybe it went through an open window with its mouth open wide and the glass cut its throat." Shark joins the group (and) asks if it was a baby bird. Kate "Should we open the box to let Shark see? Anyone else want to see?" ... Child: "Tip it in there." Penguin 1 "We don't tip it in, we put it in gently in the box." (has picked up on Kate's respectful tone). (fieldnotes)*

Subject knowledge in spontaneous teaching interactions is returned to later in this chapter.

Specialised subject knowledge in teaching interactions

Subject knowledge was acknowledged as crucial for the small group teaching episodes both in relation to the excursion and in order to respond to children's other interests too. Several examples of practice supported that this belief was acted on. Mary demonstrated this in working with children's knowledge and interests alongside her preparatory knowledge of dinosaur species classification.

> *One child shows the group a toy dinosaur. Mary "What are in these on his back?" Child "I don't know – a tyrannosaurus?" Mary "Let's look in this book I've brought today from home." She finds a picture of a tyrannosaurus and shows it to the group. She points out that its back is different to the toy. She flicks through the book to a stegosaurus and asks the children if this looks more like the toy. They decide it does not. With Mary, they look at several other pictures and compare features. Mary "Does this look like (name's) one?" Child "No, it's got a horn on its head." After*

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looking through this book, they decide to look at another book. Children are
encouraged to continue to look for similarities and differences between the pictures
and the model. In doing so, children demonstrate a range of prior knowledge and its
sources. (fieldnotes)

Through her knowledge and interactions with these children, Mary was able to construct
with them a fairly sophisticated concept. By the end of the teaching session, the group
speculated that the toy may have come from a movie and not be an accurate representation
of a particular dinosaur at all.

Shaina described some of her small group's preparatory experiences for the excursion.
We've looked at books with divers in them. I just read a book about visiting an
aquarium yesterday, ...and so we were talking about whether we might see the fish
being fed there ... and also we talked about where the fish came from, whether
they've caught them, or whether they've been born there.

Further preparatory experiences during small group teaching, such as discussions about
fish species and drawing these, screenprinting of children's drawings of sea creatures,
discussions about fishing, along with children's questions, were also recorded in the
teachers' diaries and the researcher's fieldnotes.

Evidence of children's learning resulting from the excursion indicated congruence between
beliefs and practices related to the importance of subject knowledge. Frankenstein, Shark
and Orca had wondered if they would see a whale shark at Kelly Tarlton's. Having
researched knowledge about whale sharks, Kate assisted them during a session before the
excursion to find out the dimensions of a whale shark, measure this out using string in the
kindergarten playground and form their own conclusion that it was unlikely one would be
present. After the excursion, Frankenstein drew pictures of two different sea creatures and
labelled them "whale" and "shark". Frankenstein's mother noted that Frankenstein had
sorted out the anomaly in his mind of the "whale shark".
Cara - The most important thing that he learnt, was that there are whales and there
are sharks. The whale shark isn't a whale and a shark, it is just a shark.
Cara remarked that Frankenstein also reinforced this learning by discussing this personally
significant piece of learning with his father and brother. For Cara and Frankenstein, it
seemed that this was clearly the most critical learning that occurred for Frankenstein.

Orca's specialised subject knowledge

Orca's prior knowledge about sea creatures was extensive. Three weeks prior to the excursion, Orca named and described to Shaina six species of sharks and five types of whales. He named eight other sea creatures he expected to see at Kelly Tarlton's. He also explored preparatory specialised knowledge with other children, particularly of species of sharks and penguins that they might see and where to look for them. This provided clear evidence that children's knowledge can be more comprehensive and accurate than teachers, particularly when it is domain or discipline-specific, and was evidence of the competence associated with a sociocultural view of children's capabilities. Orca's mother, Jo, and his teacher, Shaina, researched knowledge to support extended interactions with Orca prior to, during, and after the excursion. Orca's knowledge was extended in advance of the excursion primarily through the use of books (Shaina) and the Internet (Jo). He became fascinated with wanting to see the wobbegong shark and to learn how sea creatures reproduce. He and Shaina compiled a list of questions he wanted to find answers to during the excursion. In particular, perhaps because he was cared for in the afternoons by a woman whose daughter had recently had a child, and this had been an exciting event within the home he spent time in, he repeatedly posed questions about "how do (species of sea creature) get babies?"

As a result of the excursion, Orca's knowledge of sea creatures was further reinforced and extended. He had previously learned that the wobbegong was difficult to see.

> *Researcher - Where does it (wobbegong) live?*
>
> *Orca - On the bottom of the ocean.*
>
> *Researcher - Penguin 1 you told us ... the other day... that it was camouflaged.*
>
> *Penguin 1 nods.*
>
> *Researcher - And what did camouflage mean?*
>
> *Penguin 1 - It's the same colour as the rocks.*

His mother, Jo, said after the excursion that *"he was buzzed about seeing the wobbegong swimming...".* In his post-excursion interview, Orca said animatedly:

> *I found the wobbegong shark! (looking at photo)*
>
> *Researcher - How did you find it?*
>
> *Orca - Well, I saw it. It came dangling up.*

In addition, Orca had found out answers to his questions about reproduction and expressed his conceptual knowledge in ways characteristic of a young child.

Researcher - How do sharks make baby sharks?

Orca - From eggs. ... And some get them out of their tummy (noises and demonstrations).

Researcher - (They) get them out of their tummy, and some got them out of eggs. ... Do you remember what that was? Where the eggs were?

Orca - A mermaid's purse.

Researcher - ... And you also wanted to know how whales got babies. ...

Orca - Their tummy.

Researcher - And what about penguins? ...

Orca - Nests.

Prior to the excursion, Orca and Penguin 2, who had both previously been to the venue, debated whether they would see King or Emperor penguins. Orca's knowledge of penguins was limited to knowing the names of the yellow and blue species.

Researcher - Penguin 2's brought along two postcards that she got from Kelly Tarlton's last time.

Penguin 2 - They're King penguins.

Researcher - What does it say on it? Where does it tell us what kind of penguins they are Penguin 2?

(Penguin 2 points to the back of the postcard)

Researcher - On the back. And what does it say?

Penguin 2 - King penguins (pointing to words).

Researcher - It says King penguins. So do you know the difference between King penguins and Emperor penguins?

Orca - Well, there's heaps of different types well <u>my Mum said</u> (emphasised) that the only penguins you see at Kelly Tarlton's was the Emperor.

Researcher - Okay, well we'll find that out tomorrow shall we?

After the excursion, Orca acknowledged that the penguins were King penguins, and the researcher asked him what the difference was between the species. *"Emperor are bigger and the Kings are smaller".* Jo admitted that she may have been the source of his initial confusion: *"Were they King penguins? I thought they were going to be Emperor Penguins quite honestly."* This example shows that adults' conceptual knowledge can develop alongside children's during learning experiences.

Penguin 2 extends her knowledge

The children's interviews prior to the excursion, fieldnotes and Lucy's diary revealed that Penguin 2 also had many content-related questions she wanted answered. Penguin 2 and Penguin 1 revealed their learning and collaborative understandings in their post-excursion interview.

Researcher - And did you find out how penguins breathe under water?

Penguin 2 - Um they come up for a little breath.

Researcher - ... How do fish breathe?

Penguin 2 - Through their gills.

Penguin 1 - Under the water.

Researcher - The other question you had was you wanted to know if the penguins were as big as you.

Penguin 2 - No, cos the King penguins are a bit bigger than me.

Researcher - Do you think one day you might be as big as the penguins?

Penguin 2 - No way!

Penguin 1 - Oh yes she will when she's an adult.

Penguin 2's mother, Lucy, noted in the parents' interview and diary that Penguin 2 felt vindicated about the penguin classification argument with Orca.

Lucy - Penguin 2 was in the debate of the penguins. What kind they were, that was very important. (She) and Orca have been having this debate for a week.

Penguin 2 was emphatic in her response after the excursion.

Researcher - So were they King or Emperor?

Penguin 2 - King penguins!

Subject knowledge was also commonly a focus of further inquiry. Penguin 2's initial focus for the excursion was on species of penguins. After the excursion, she had begun exploring further conceptual knowledge as a result of the experience. Lucy reported that:

She wanted to know what kryll look like, and what happens when ice melts.... ... and why the king chicks are brown ... how the feathers changed over. Why is it called a nurse shark? .... And why did the leopard seals eat the penguins?

The excursion experience led to rapid expansion in Penguin 2's interests. Her burgeoning knowledge included both general and specialised knowledge.

Orca and Shark's technology knowledge

An interest in engineering was extended for Orca and Shark. Both children said in interviews prior to the excursion that they enjoyed playing with construction equipment at home and kindergarten. Following the excursion, both were keen to explore theories about how the mechanical orca whale rose in the water with a seal in its mouth.

Orca - That part's the best part, ... when the orca whale came up. They go into the special door.

Researcher - What makes it special do you think?

Orca - Cause ... there's a spring what pops it up. Bonk! Imagine when it comes up really fast. We might get splashed.

Shark discussed his theory in relation to drawings that he had completed at home of the Antarctic Encounter four days after the excursion.

Shark - They (orca whale and seal) came out of there (pointing to drawing).

Researcher - How do you think it came up?

Shark - Ah the whale came up when the switch came on and if the light was on the orca whale came up and down.

Researcher - And how did it get up again?

Shark - Ah it shot up it came up real fast.

Rose's diary (Shark's mother) also contained evidence of this inquiry about the engineering involved. Further, in the parents' post-excursion interview, Rose commented that Shark wanted to know how Kelly Tarlton's was built and constructed and how to get the glass thick enough to hold all the water. He had both drawn pictures and constructed a model to explore his thinking. Discussing Shark's drawing with him revealed that he had a global conception of the Antarctic encounter building as he pointed to and recalled different parts of his drawing.

Shark - Ah look! This is Kelly Tarlton's! ... the train is going in the snowstorm ... and the whale is eating the shark and he's coming out.

Shark also recalled constructing his model of the shark tunnel at home.

Researcher - What did you build it out of?

Shark - I tried to build it out of ah with blocks and boxes and paper and I make lots of fish. I make a real Kelly Tarlton's at home. ... I made a real one.

These examples provided evidence of children's natural curiosity, active inquiry and development of memory and recall as metacognitive abilities, while in the process of constructing and building subject knowledge. They were also developing the learning orientations and social identities that Carr (2001b) might describe as "being a scientist" or "being a technologist". Penguin 2's post-excursion questions and Shark's drawing and building of a model of Kelly Tarlton's also illustrated that in providing opportunities for children's knowledge to develop and extend, further interests and learning are stimulated.

Subject knowledge in spontaneous teaching

In most spontaneous learning and teaching interactions, subject content knowledge was potentially present, but perhaps underestimated by teachers as an important element of children's learning. Teachers' focus tended to be on cognitive skills of thinking, reasoning and problem-solving. In the following example, Penguin 2 investigated the physics of centrifugal force, weight and displacement in a vortex tube.

Penguin 2 was previously holding the vortex tube and told some other children "The air comes up there through the bubbles." Kate asks "How does it (air) get from here to here?" Penguin 2 "Maybe it floats up." Kate points out small air bubbles. Penguin 2 suggests they need a magnifying glass, gets it and puts it up to the bottle. She asks, "How does it get up here? We need to take this (the connecting piece between bottles) off and catch one." Kate "Do you think these air bubbles are carrying the air through from the other bottle?" Penguin 2 "I don't know." Kate takes the connector off and Penguin 2 hears the air escaping. Then Kate squeezes the bottle to see if Penguin 2 can feel the air. She can. Kate suggests they get 'Squidy the cartesian diver' (a piece of scientific equipment from the resource room) to demonstrate. She gets the instructions out and reads them with the children. "How can you tell if there is air in something? You put the diver in the water. If he floats, we know there's air in him." Penguin 2 "He does float!" Kate then has Penguin 2 squeeze Squidy so he is full of water. He sinks. The children hypothesise that he sinks because he is full of water, but he floats when he is full of air, so maybe air comes up above water. The interaction concludes at this point. (fieldnotes)

In this example, Penguin 2 did not have her self-discovery of a principle of physics confirmed or explained, thereby gaining subject knowledge. She may continue revisiting this learning until this confirmation occurs, rather than extend her learning further.

Teachers' incorporation of subject knowledge during spontaneous teaching interactions would have been compatible with the focus on cognitive skills but was underemphasised in practice. It was also possible that Kate's own understanding of physics was a barrier to this occurring.

Nevertheless, parents expressed beliefs that the beginning of subject learning was occurring during children's play at the kindergarten.

> *Researcher - Can you see the basis of any of those (subjects) coming through in what your children are doing or learning now?*
>
> *Lucy - All the time.*
>
> *Jo - Very definitely.*
>
> *Lucy - Oh, I mean, even the starting to recognising their name. ... measuring and weighing things and following a recipe that they've being doing, all those things.*
>
> *Anne - And sharing is a kind of division of maths. ... and reading ... they start at the beginning of the book, left and right.*
>
> *Jo - The way that you turn the page and the words go across this way.*
>
> *Lucy -The love of reading because they enjoy stories.*
>
> *Jo - I know ... that he learns from playing outside. ... physics, that they learn about, ... like volume ... with their water play and filling up containers of sand and ... their creativity of building things and the imagination that it fosters.*

The links between beliefs and practices supported that in relation to planned learning experiences such as the excursion and small group teaching times, teachers used subject knowledge. In contrast to DeMarie's (2001) findings, the excursion significantly extended children's knowledge of sea creatures. As one teacher stated after the excursion:

> *Shaina - Children were more aware of what was what (species of sea creatures) ... and that really descriptive language came out.*

This suggests that excursions indeed have potential for increasing children's learning. The value of an excursion as a learning experience is further elaborated on in chapter five.

However, subject knowledge was commonly underemphasised, or not included as part of teachers' responses to children's inquiries, in spontaneous interactions. These form the majority of the teaching and learning experiences in this kindergarten. Examples observed included: teachers providing equipment at children's request to build volcanoes in the

sandpit, but not using language related to the geology of volcanoes or explanation of the chemical reaction between vinegar and baking soda; a child discussing the mechanics of car engines and design with a teacher; children discussing astronomy, rocketry and space travel with a teacher; children asking a teacher how a large ship could float on the sea; children asking a teacher why sand and water were insufficient to make concrete; a child asking why white glue dried colourless; and children asking about the processes of screenprinting, trying to understand why they used the cut-out template, rather than the picture that they had drawn, to make the print.

Further, given its child-initiated, play-based, integrated philosophy, it is likely that most teaching in early childhood education occurs during spontaneous interactions where teachers engage with children's play and learning. Unreturning moments form windows of opportunity to engage children in learning. The role of teachers' subject knowledge in enhancing this learning is clearly identifiable, for example, in Kate's interaction with children determining the size of a whale shark.

The impact of the research

The wider underemphasis on subject knowledge in teaching practice raises the possibility that the research itself perhaps influenced teachers and parents to act on their beliefs about subject knowledge in a way that they may not have consciously done so otherwise. The excursion and the research may have crystallised beliefs and practices about the content of curriculum and children's learning into sharper focus, bringing these beliefs from the periphery of teacher thought and action to a more conscious level.

> *Mary - And probably I think because you were here. … You know those parents that you had talked to beforehand and they had to take notes. … This wouldn't have been happening otherwise, would it. The notebook. They probably may not have been so focused on … the discussion side of things.*

What Mary suggests here with regard to the parents, may also be true of the teachers. Moreover, it is possible that the focus of the research encouraged the teachers to provide more preparation and follow-up experiences than usual.

> *Kate - I think that we have continued with our discussions (with the children) longer than what we probably would have.*

In their second interview, the teachers noted that the research had contributed to reflection about curriculum and pedagogy but expressed concern that there had been the potential to let the excursion dominate the programme.

> *Shaina - One thing ... that you did make me think about, ... We were doing some drawings or something, I thought, is this right? Because (I was doing this with) all the children, not just the ones that were interested, and I thought, should I be doing this?*
>
> *Mary - It was one lunchtime wasn't it? ... we were all talking about it. We thought it had become 'fishy'.*

However, the research appeared to improve the learning potential of the excursion and coincided with a change to session routines, incorporating small group teaching.

> *Researcher - You have already said earlier, that you thought that maybe the trip was more focused, because parents were more focused on needing to keep notes and things. Is there any other way that you think just me being here might have had an influence?*
>
> *Mary - And probably the lead up to it ... was a bit more than what we normally would have done. ... But then on saying that, it coincided with us starting our small group time. ... we had the opportunity to do it. And to be more focused.*

Links between beliefs and curriculum documentation

Had subject content knowledge been explicitly addressed in curriculum documentation, this would have provided an indication that teachers acted on beliefs about its importance. However, teachers' beliefs were not evident in curriculum documentation, revealing an additional discrepancy between beliefs and practice, and again the possibility that the research itself encouraged actions and reflection on beliefs. It may also have been possible that there was a more widespread mismatch between teaching practice and curriculum documentation as teachers attempted to make the process of documentation manageable. The two main forms of curriculum documentation were children's portfolios and programme planning and evaluation material.

Children's portfolios

The documenting of children's learning in individual profiles or portfolios (the terms were used interchangeably by the participants) was the primary assessment, planning and evaluation process operating in this kindergarten. The material collected by this team of

teachers was extensive. The portfolios contained genuine examples of children's learning processes and curriculum experiences, strengths and interests. Children had the opportunity to participate in offering contributions.

> *Penguin 1 - Can you give this to Shaina for my profile?*

Their interests directly influenced curriculum planning, including the excursion venues.

> *Orca - It was my idea to go to Kelly Tarlton's.*
>
> *Researcher - Why was it your idea to go to Kelly Tarlton's?*
>
> *Orca - To show everyone what, what we could see there.*

Portfolios support a sociocultural perspective on authentic and dynamic assessment within this community of practice (Cullen, 2001). Orca's portfolio clearly showed his prior knowledge and interest in Kelly Tarlton's, including photographs of dramatic and water play, recorded his knowledge of sea creatures and was completed with photographs taken on the excursion. However, while the researcher did not have access to all portfolios, material related to subject knowledge in these appeared to be rare. Orca's portfolio was unmatched in this emphasis on subject knowledge. Kate agreed with the contention that most portfolios did not contain evidence of children's subject content learning.

Curriculum based on *Te Whāriki*

The teachers developed fifteen plans for the group of children, using strands and goals from *Te Whāriki,* during the planning meetings the researcher attended (see appendix 11). Each plan typically catered for one learning outcome designed to extend children's abilities and interests, based on observation and assessment of all the focus children in each planning cycle. However, evidence of planning for content learning occurred only once in one plan. This was the teachers' objective included in Orca's individual plan to support his prior knowledge. Orca's mother, Jo, had contributed to Orca's plan that

> *Orca has a great interest in finding out factual information. To satisfy his thirst for knowledge he has to have detailed information e.g., not just a shark, it has to be a hammerhead ... great white... tiger shark etc.*

Orca's learning goal devised by the teachers became Exploration goal 4 "Children experience an environment where they are developing working theories for making sense of the natural, social, physical and material worlds". The teachers' learning outcome added content knowledge: "For Orca to extend and build on his knowledge and working theories about the living world, in particular sea life, through an excursion to Kelly

Tarlton's and related curriculum experiences". In the evaluation, it was noted that the outcome had been achieved, and supported by the home environment. This emphasis on content was not however transferred to the group plan with the same learning goal. In the written evaluations of learning outcomes achieved during the research period, only one further reference was made to a child's subject content learning. This was of symbols related to literacy.

The documentation collected, and the curriculum planning and evaluation meetings attended, provided further evidence that the focus of the planning and evaluation was on individual children - their learning processes, dispositions or skills related to specific strands and goals of *Te Whāriki* - and the provision of an experience-rich environment for children to choose from. For example, where the strand of exploration was utilised, cognitive processes of thinking, reasoning and problem-solving were emphasised in the curriculum experiences to be available, but not ideas about the subject content that may foster cognitive processes. This emphasis within the planning supported Kate's focus in her interaction with Penguin 2 with the vortex tube. The small group teaching sessions were not formally planned and evaluated in writing. Had they been written up, evidence of acting on beliefs about the importance of subject knowledge may have been visible in documentation.

This section has explained the beliefs that teachers, parents and children held about the importance of subject content knowledge as a component of teachers' professional knowledge. Links between beliefs and practice demonstrated that teachers acted on their beliefs during planned interactions. Moreover, they recognised the need to access knowledge as required. However, during spontaneous teaching interactions initiated by children, subject knowledge was underemphasised. Curriculum documentation, which was based as would be expected on *Te Whāriki,* did not demonstrate acting on this belief either. *Te Whāriki's* underemphasis on subject knowledge and curriculum content, and the impact of this on curriculum children experience and teachers' practices are highlighted. During discussion of the research findings, teachers displayed heightened awareness of the significance of subject knowledge in children's learning and the value of documenting this. This further suggests that the research itself assisted teachers to reflect on the congruence of their beliefs and practices with regard to subject knowledge.

Knowledge of pedagogy and philosophy

Pedagogical knowledge in this study refers to knowledge of effective teaching and learning processes congruent with early childhood philosophy. Play and utilising children's interests as the central means of early childhood pedagogy is used as the basis of the discussion.

Play as pedagogy

Western early childhood education promotes play as central to pedagogy. This is reflected in philosophical concepts such as child-initiated, integrated, play-based and curriculum based on children's interests. Teachers' and parents' beliefs about pedagogy reflected these concepts. Their views also focused on developing skills, rather than consciously supporting the construction of subject knowledge through play.

One teacher's comment summarised their beliefs.

> *Shaina - You can learn to teach children things in many different ways. Because I believe that if you're not interested in something, you're not really going to focus on it and take it in ... if you sit them down and say, okay I'd like you to learn fine motor skills, draw this picture, they're just going to ... do a scribble and say see ya later. Whereas, if they are interested in carpentry, they're still going to get that fine motor skill, but it is something that they're interested in. They might be really skilled in doing carpentry and let's build on that in what they're really interested in rather than something that they're not interested in really.*

One parent was also specific on the value of play for children's learning:

> *Lucy - ... I'm working as a physio in schools, ... a lot of the gross motor ... playing here is actually vital to strengthening and getting ready for writing.*

In contrast, many parents saw no considered connection between play, teaching and learning at kindergarten. Anne commented:

> *When they are playing, if they learn something, it's serendipity, it's a happy accident.*

Some parents equated learning with a more structured approach to pedagogy, and therefore saw the planned times groups of children spent with teachers as when learning occurred.

> *Eve - I think those groups they have just started, they are brilliant. Really, really good. Lots of learning.*

Several parents were in agreement again with Anne when she stated:

It's the emphasis, I mean here it is 90% play, 10% mat time. At school it is the
opposite way around. ... It is more structured learning.

The teachers realised that parents' understanding of the teacher's role and play as
pedagogy was not extensive, and noted both the invisibility of their pedagogy and a
responsibility to communicate with parents as part of early childhood philosophy.

Mary - I think for us, it is not so easily identifiable, what we actually do ... I think a
lot of what we do isn't so obvious.

Kate - Tangible.

Shaina - It's not a yes or no thing children's learning.

Mary - It is like taking it out of our head and putting it down in black and white isn't
it? So they (parents) can actually see what is going on.

Shaina - It is. For some of the activities, I don't think they really would stop and
think what their child is actually learning from this activity.

Mary - They just come in and see the children doing it.

Shaina - They've got to know why we're doing things. ... I think we have to spell it
out for them and make it really clear.

Mary - I think that is really good for us, like as a profession.

Kate - It is good for us to be able to articulate our philosophy. ...

Mary - I think that is what has happened in early childhood education, no one has
really known why we do things.

These exchanges reveal the divide in understanding between teachers and parents about
early childhood pedagogy and philosophy. Teachers' professional knowledge equipped
them to teach children effectively in accordance with early childhood philosophy.
However, the focus of their teaching in spontaneous interactions appeared to be on
developmental skills rather than subject knowledge. Parents perhaps relied on their
memories of education that did not stretch back to early childhood. The dominance of
beliefs that reflected the pedagogy of the primary and secondary sectors was evident.
Alternatively, they may genuinely possess beliefs that formal teaching is best for
noticeable learning, reflected in their enthusiasm for the small group teaching. The
parents' beliefs support the findings of Foot, Howe, Cheyne, Terras and Rattray (2000),
Sharpe (1991), and Stipek, Milburn, Clements and Daniels (1992), that teachers' and
parents' beliefs differ and may become a source of pressure to provide more formal

teaching. Kate, Shaina and Mary's thoughtful reflections that early childhood teachers need to take responsibility for articulating their expertise to facilitate clearer understandings of early childhood pedagogy to parents was timely if they wished to avoid misunderstanding about the small group teaching.

Links between beliefs and practices

The three teachers' beliefs about pedagogy reflected philosophical beliefs about child-initiated, play-based, integrated curriculum. Their teaching was consistent with their beliefs. For example, during both planned small group and spontaneous teaching, Shaina was confident and relaxed with children, following their interests and leads. During the cooking of pikelets she remained calm about responding to safety issues with children, for example, ensuring cooking implements were clean, the dangers of heat and fire, and holding knives safely. Subject content knowledge was embedded in, but not highlighted, in such interactions.

Children's play and interests

Utilising children's interests as a basis for teaching was evident for both teachers and parents. Teachers utilised children's play and interests to extend children's cognitive skills during individual and group interactions. Sometimes this involved teachers' subject knowledge. The example included in the previous section on subject content knowledge of the dead bird was evidence of this.

When discussing subjects, parents commonly emphasised a belief in the importance of literacy learning. Some parents discussed the strategies they have used to teach writing skills, such as use of magnetic letters, writing stories and names. One parent, Cara, described her teaching her sons to write through utilising their interests.

The easiest way I found to teach my kids to write, is to do it with things they like. Like with Henry, he was drawing and he would make little pictures out of the letters and put the pictures together, whereas Frankenstein, it's basically just writing, putting the shapes together and making up little stories and things like that.

Consultation with parents prior to the research had resulted in trialling the use of small group teaching at the beginning of each session. Teachers planned these informally based on children's interests, including direct consultation with the group of children about

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experiences they would like included in these sessions. Parents have seen small group sessions as an opportunity for more structured and focused learning. During the research period, the time spent in small groups grew from approximately ten minutes to 20-30 minutes, depending on children's interests and concentration. The teachers were pleased with the opportunities and changes occurring. The small group teaching provided focused opportunities for content teaching as well as encouraging children's cognitive abilities. Children talked to their parents about these sessions, where previously children rarely informed parents of their experiences. Comments from parents included:

Sue - They've only just started, those small group times, and it has just been fantastic, because you actually hear what happens at kindy now. Penguin 1 will go "Oh did I tell you what we did at kindy?" Whereas before – nothing.

However, as previously noted, these sessions were planned and evaluated informally and were not documented. Therefore teachers' and parents' verbal impressions of the value of these sessions were not supported by evidence that organisations such as ERO could access. While the researcher was able to observe and document these interactions in relation to subject knowledge, perhaps because teachers were actively involved in teaching fifteen children at these times, written observations of children that might include examples of subject knowledge learning were not undertaken and documented by the teachers.

Most of the teachers' interactions reflected an emphasis on promoting thinking, reasoning and problem-solving. Listening carefully to children's thinking and questions is vital to acknowledging them as competent, capable learners. Moreover, listening and responding with questions as a pedagogical technique to explore children's ideas and reasoning is useful. Not all children's inquiries may be knowledge-related in the usual sense. For example, a question such as "Where does the rain come from?" may reflect children's metaphorical or creative thinking rather than seeking a literal answer (White, M., 2002). Children's inquiries focused on in the present study of subject content knowledge were knowledge-related, and teachers commonly underemphasised the content aspect of children's inquiry processes. The earlier example of Kate and Penguin 2's interaction with the vortex tube demonstrated this. All three teachers acknowledged that this was an accurate finding of the study and linked their pedagogical emphasis to the learning outcomes of the exploration strand in *Te Whāriki*.

Using questions as a technique ought to be guided by the teachers' subject knowledge to ensure that the questions are meaningful, and sustain children's curiosity so that they can find their own answers and co-construct knowledge with teachers. For example, Penguin 2's mother, Lucy, stated that Penguin 2 had some of her subject content-related questions answered through her own thinking and inquiry processes.

> *And then she was fascinated to know how the penguins could breathe - that they come up for air and then go back down again. ... She saw them as we went past so she was pleased about that. She didn't actually talk a lot about it afterwards, ... but I could see her thinking.*

Lucy also noted that both she and teachers had spent time talking and listening to Penguin 2 to explore her thinking, but that her own conceptual knowledge was a partial barrier to extending Penguin 2's knowledge.

Pedagogical content knowledge

Descriptions of children's inquiry learning in the present study identified that for children, learning subject knowledge was indeed important. This suggests that debate in early childhood that has led to the polarised views described earlier might be less acute if rethought from another perspective. Perhaps it is not subjects per se, but how teachers assist children to construct subject content knowledge that is the central pedagogical issue for early childhood education. Therefore the following section explores the validity in early childhood of the construct of pedagogical content knowledge, a term that blends the two concepts of subject knowledge and pedagogical knowledge.

Kate believed that interactions based on planning for children's thinking, reasoning and problem-solving provided the opportunity to lead children's thinking.

> *Kate - It's okay to explore those different concepts ... just explore that thinking that's happening, not just us being the knowledgeable ones that say, that's the way it is.*

Contemporary theories of learning and teaching support Kate's contention that providing knowledge in a transmission approach is inappropriate in early childhood education. Yet teachers' subject knowledge is likely to contribute to the types of questions and comments teachers include in their interactions with children. In promoting children's thinking and inquiry in meaningful ways, teachers can, at the same time, also co-construct appropriate conceptual knowledge with children. This suggests that the concept of pedagogical content knowledge may be worthy of application in early childhood education to resolve

pedagogical tensions. Shulman (1986) identified three components of pedagogical content knowledge: knowledge of a subject; knowledge of children's existing knowledge and beliefs about the subject; and knowledge of effective ways to represent this subject to children.

The added value of teachers' confidence in accurate subject content knowledge to assist children's understanding of phenomena was evident in the following episode. Kate had popped corn with her small group one morning, but in her explanation to the children had related the popping process to the dry heat of the frypan or popcorn maker. Two children followed this up later in the morning with wet kernels.

> *The popcorn pops and Kate says in an aside to me "I wasn't sure if it would work*
> *because they were wet." I explain that it is water content heating inside the*
> *kernel that expands and makes it "pop" and basically turn inside out into starch,*
> *so the water on the outside would have just evaporated first. She replies, "Is it? I*
> *didn't know that, thank you for telling me." (fieldnotes)*

A few days later, Shaina made popcorn with her group and explained accurately how the corn pops in response to children's inquiry. She said Kate had told her about this. In the second focus group, Kate said the following as part of a discussion about what kind of baseline subject knowledge teachers need, as a result of her realisation that accurate teacher knowledge and understanding were important.

> *Kate - And I expect myself to have skills in science as well, and an understanding of*
> *how popcorn pops (laughter).*

Shaina also identified the value of pedagogical content knowledge in the discussion.

> *Shaina - Trying to articulate that in a way that is relevant to them (children), and*
> *that they can understand, it is actually really hard. ... But what can be hard*
> *sometimes, is then taking the explanation and being able to say it to a four year old.*
> *So, okay this is the explanation, how can I say that to these children so they can*
> *actually understand it?*

During parents' discussion that began with talking about children's interest in building volcanoes in the sandpit and the potential learning from this, parents expressed the following beliefs about pedagogical content knowledge. These beliefs indicate that teachers' knowledge and choice of language are important, but also that knowledge needs

to be explained at a level appropriate to children's prior knowledge, experience and ability to understand.

> *Researcher - How would you feel if you were told that teachers didn't have the conceptual knowledge to explain those things to children, even when they were asking?*
>
> *Cara - Now that's one, I do think you need that knowledge. I think it is a base for the learning later, so they (teachers) need to know what lava is, not just hot liquid. And if they (teachers) don't know what it is, then they (children) are learning it twice which can be confusing.*
>
> *Researcher - And what about the chemical reaction?*
>
> *Cara - I think if they are going to do an experiment like that, you should have knowledge.*
>
> *Jo - Some, at least some knowledge of what it is, or to be able to find out.*
>
> *Anne - You have got to know it quite well to be able to explain it on that real simple level.*
>
> *Jo - But it also has to be factual. I think there is no point in talking to children about things, particularly things like things that happen in nature, if you are not using the factual language that revolves around it. Obviously, with the age of the child, you need to sort of modify that language, but words that describe a particular happening should be the correct words.*

One parent, Lucy, revealed that she had found it difficult to explain answers to some of her daughter's questions that arose from the excursion. Other parents supported her efforts and commented perceptively on Penguin 2's thinking and learning.

> *Lucy - She wanted to know what kryll look like, and what happens when ice melts.*
>
> *Researcher - And how did you explain those things?*
>
> *Lucy - Well, she came up with it, that kryll were like insects in the water or something like that.*
>
> *Jo - That's pretty accurate isn't it?*
>
> *Lucy - (Yes), pretty good. (How) ice melts was a bit hard, so I didn't go into that one too much, I thought it was a bit hard to explain. Um, why is it called a nurse shark? I didn't go into that. And why did the leopard seals eat the penguins? ...*
>
> *Sue - Gosh, she's been doing a lot of thinking hasn't she?*
>
> *Lucy - But we had the book to follow up so that was good.*
>
> *Anne - She was asking hard questions, you know easy questions, but hard answers.*

This exchange suggested that parents, as well as teachers, understood that teaching and learning content is not just about knowledge or pedagogy per se. It also further supports the contention that adults' conceptual understanding is crucial to having the ability to accurately explain ideas to children, taking into account their prior knowledge and abilities.

Grossman (1990) noted that as research moved towards accounts of secondary teaching that took account of subject matter, pedagogical content knowledge became even more important to consider. The present study highlights this for early childhood education. Wood and Attfield (1996) argue that within a sociocultural approach, knowledge of subjects needs to be related to teachers' pedagogical knowledge so that young children have relevant, appropriate and contextual learning. Increased visibility of subject content knowledge paves the way for recognition and further exploration of the construct of pedagogical content knowledge in early childhood education too.

Knowledge of learners

In constructing new understandings, children, as experienced learners, bring applicable and relevant knowledge and experience to learning situations. Teachers' knowledge of individual children's capabilities and interests, prior knowledge and learning preferences were identified in curriculum documentation, expressed during the interviews and evident in practice. Several parents expressed positive beliefs about the teachers' knowledge of their individual children as learners.

> *Lucy - They've done a really good observation on how she learns, and they've taken that and geared her towards activities, that would encourage that and grow that in her.*

Penguin 2 expressed this belief about kindergarten teachers' knowledge of the children:

> *They need to know the kids.*

Both parents and teachers emphasised the importance of an environment that values learning based on children's interests. Shaina summarised the teachers' beliefs:

> *Shaina - Find out what their interests are and what their strengths are. Finding what they're capable of and maybe not so capable of.*

Furthermore, teachers' knowledge of each family's contribution to children's learning was apparent. Teachers were aware that Orca's knowledge and interest in sea creatures was aided by Jo encouraging him to use books and the internet as learning resources, and that

he went fishing with his grandfather. Similarly, Kitten said in his interview that he went fishing with his father, and it was clear that this experiential learning enabled him to identify snapper at Kelly Tarlton's.

In relation to teaching and learning interactions, Jo expressed the following:

> *You kind of limit their (children's) learning, by relating to them as a pre-schooler I suppose.*

Jo realised that children, and in particular her son, may be more capable than developmental views of children might suggest.

Links between beliefs and practices

In accordance with *Te Whāriki*, the basis of curriculum planning was knowledge of individual children's interests. The most prominent example of this was the excursion experience planned for several children's interests, including Orca and Penguin 2 who participated in this study.

Portfolios were used as a communication tool with parents to share knowledge of individuals and better meet the child's learning interests and needs. Parents were involved in planning and evaluation, especially when their child was a focus child. The use of portfolios as pedagogical documentation (Alcock, 2000; Helm, Benneke & Steinheimer, 1998) to increase knowledge of individual children and for communication with parents about planning processes and children's learning was enthusiastically commented on by teachers.

> *Kate - Underneath each photo that we've taken, we explain what the child is doing and then we (make) links to Te Whāriki. We don't just put pictures in, ... without having something written about it and relating it to what we're actually doing.*
>
> *Shaina - We are working on the individual children, as well it is for the whole group. When we have set the goal we show the parents and involve them in the process and talk about what we are going to be doing and working on and if they can input in any way, and explain how it fits into the curriculum.*

Parents supported this enthusiasm for portfolios.

> *Lucy - They seem to have a really good grasp of the curriculum and relating an activity that the child is doing to that and then how to move on, (and) they relate the portfolios to that really nicely.*

Knowledge of children as learners, with individual abilities, concerns and interests, coupled with knowledge of the home environment, enabled teachers to plan curriculum that was relevant and responsive to children's lives and teach effectively during both planned and spontaneous interactions. However, as noted, this teaching did not often highlight subject knowledge construction. Teachers' beliefs and practices were congruent with regard to knowledge of learners.

Knowledge of context

Tripp (1993) cautions that research must take account of contextual constraints that impact on teachers' practices in order to present a fair picture of both teachers and practice. Inconsistency between teacher beliefs and practices has been previously noted in the literature (Fang, 1996), along with identification that one reason for this may be contextual constraints that operate in the setting. Grossman's (1990) definition of context would include the kindergarten setting and physical environment, the organisational systems and culture, teacher experience and personal characteristics, staff stability and working conditions, and knowledge of families and community. She states that these are all part of the understanding of context that a teacher needs to acquire. However it is beyond the scope of this thesis to address all these aspects. Those considered in this section are limited to the two revealed spontaneously by parents and teachers as most important during the interviews and that link to provision of subject knowledge opportunities: group size and the transition between kindergarten and junior primary school.

Group size

In this study, group size emerged as a contextual constraint of concern to the teachers during spontaneous teaching.

> *Kate - I don't think ratios are the biggest issue, I think it is the (total) number of children.*
>
> *Shaina - It is a difficulty for a whole lot of reasons. ...*
>
> *Mary - And to follow up on an interest. ... It is really hard to be involved for any length of time.*
>
> *Shaina - And if you're doing ... group work during the session, because of the numbers there's more chances that you are going to be interrupted or disrupted from that group work and you're going to have to leave it.*

To manage appropriate supervision of the learning environment during each session, two teachers had designated duty areas inside and outside the kindergarten building. The third teacher worked in either area according to her professional judgement. The teacher outside had a large area to cover and frequently used the support of the third teacher. Extended interactions outside in places other than the sandpit were rare. Supervision and safety, appropriate use of equipment and attending to conflicts between children appeared to take priority. Examination of the occasions recorded where teachers had either failed to pick up on children's subject knowledge cues, or not used their subject knowledge to respond to and extend children (see pp. 81-83), revealed that the majority of these occurred in the outside area. This seemed then to be directly related to the group size and ratio issues, had implications for the quality of teaching and learning interactions, and teachers' ability to employ subject knowledge and contemporary pedagogical techniques to co-construct and extend children's knowledge.

A logical implication would be that a smaller group size, with fewer interruptions, would facilitate further subject knowledge learning opportunities during child-initiated spontaneous learning and teaching. This is supported by Fang's (1996) finding that where teaching and learning interactions are numerous and complex, teachers do not always have time to reflect on links between their beliefs and practices. This is the case with the large group size in this kindergarten and the complexity of teacher roles, which may limit teachers' consideration of the link between the development of cognitive skills and the construction of subject knowledge.

The following exchange between parents occurred while discussing home and kindergarten practices. Jo described a possible literacy experience. Meg suggested that this type of experience may be difficult to provide in this environment due to the constraint of group size and offered an alternative in keeping with early childhood philosophy.

> *Jo - One of my daughters at the kindergarten that she went to, ... at their morning mat time, which I thought was a wonderful idea, is that they would read a story. Once they'd finished reading the story, the children then went from the mat to ... the painting or drawing area, and they then had to draw a picture that related to the story. Like each morning ... they'd illustrate it, and if they could write the words, or even the beginning of the words, then they would do that, otherwise the teacher would write, and they would always, all of them would have to make an attempt at*

writing their name on their piece of work. ... It was sort of like a routine, and as long as they made an honest attempt at completing the task, then once they had done that they could go off and play and do whatever. Some of them wanted to carry on with painting or writing ... .

Meg - Don't you think though with only three teachers here, it is going to take an awful lot of effort to try and enforce somebody to try and finish a task and then go off, that sort of structure, that is quite a structured project isn't it?

Jo - Yes it was quite structured.

Meg - Whereas if you just have a table and they could come or go.

Managing a large group was perhaps likely to bring constraints on children's play and exploration. Yet children's mention of such limits within this context only related to boundaries they accepted and understood their play operated within, such as not taking sand inside, whether or not inside equipment could be taken outside, and not climbing the fence to retrieve equipment. They did not feel restricted by this in initiating play ideas.

The kindergarten/junior primary nexus

A further interpretation of context is the beliefs that teachers, parents and children raised in relation to similarities and differences between the kindergarten and junior primary school, and the transition between these early years educational contexts for children. Teachers, parents and children expressed beliefs that there is a contrast in pedagogical approaches in the two sectors of the early years. All three groups of participants in the present study expected children to experience more formal approaches to subject learning such as literacy and mathematics in primary school.

Penguin 1 had recently begun school visits once a fortnight. She was excited about her upcoming fifth birthday and her impending move to primary school, and brought her newly-purchased school uniform in to show everyone. In one interview, she expressed:

You need to do writing at school and go on more mat-times ... You have to sit in a circle ... a circle always.

Researcher - ... So can you already do writing at kindy?

Penguin 1 nods.

Researcher - What do you think you'll do differently at school? What will you learn differently?

Penguin 1 - I told you writing, I told you mat-times.

Researcher - But that sounds like the same as kindy to me.

Penguin 1 - It isn't because you need to sit at tables sometimes.

Researcher - Why do you sit at tables?

Penguin 1 - Cos you need to sit at tables when you do writing.

Researcher - What else do you do at the tables?

Penguin 1 - You gotta do maths.

Many parents also believed and indeed valued that junior primary would be more formal. Their suggestions for the kindergarten reflected this belief that formal learning occurred in a more structured environment.

Anne - It's the emphasis, I mean here it is 90% play, 10% mat time. At school it is the opposite way around. ... It is more structured learning.

Sue - I think that's the big difference isn't it from kindy and school. They get told (at school) that this is what they're doing now, and they have to.

Parents noted that this change may cause adjustment difficulties for some children. Lucy commented:

It must be a real adjustment for some kids, into the classroom. ... Because of the free play down to the structure, and some of the kids just don't learn like that.

Researcher - So do you think there are different expectations on the part of the teachers?

Lucy - Absolutely. It's sort of sit down, be quiet and get on with it. Not totally, but comparatively.

The teachers, too, equated the change from kindergarten to school as "structure" that contrasted with their approach. Kate expressed her belief as:

It's more structured learning following a curriculum, as opposed to following actual interests of children.

One parent's belief summed up several parents' comments and supported Kate's view.

Jo - We talked last week about our kindy teachers in particular being very good at finding children's strengths, and running with that, as far as then teaching them some of the skills that they're not quite so good at by using their interest. Whereas really at school they don't do that at all. ... the children have to do whatever there is, whatever the plan is.

A contrast is evident here between approving of the individually-appropriate curriculum based on children's interests occurring in the kindergarten and valuing the formal teaching approaches that occur typically in groups in primary school settings.

Links between beliefs and practices

Group size for the number of teachers was a constraint on their ability to engage in sustained spontaneous interactions with children. Their belief was borne out in practice as they were frequently interrupted. They noted this particularly in comparison with the researcher's ability to remain with children.

> *Mary - You're more able to stay with the group. ... whereas we suddenly have to get up and you know.*
>
> *Researcher - Deal with the vomit, or the dead bird (laughter).*
>
> *Mary - Or a parent, or the phone, ...*

The small group teaching opportunity at the beginning of each session demonstrated the more focused learning potential of this as one strategy to manage group size. Parents' enthusiasm for the small group teaching partly related to their viewing these as more structured opportunities for subject learning than the normal child-initiated, play-based learning environment for a large group of children. Furthermore, they perceived the small group session as preparing children for the more structured demands and subject-based approaches of primary school.

> *Researcher - Linking into the last interview, a few of you actually talked about reading and writing and how important you thought that was. How important is it to you that children acquire some concepts about literacy and numeracy, science at kindergarten? Is it important?*
>
> *Sue - It is. It makes the transition to school so much easier... because they know something when they get there. Yeah, just such a big change for them. I just think it makes it easier.*

Early literacy experiences similar to that which Jo and Meg described (see p. 97) were actually already in practice in the kindergarten, during both planned and spontaneous teaching, but not always documented. This suggested that parents may not have a full picture of practices that occurred at the kindergarten.

However, communication generally between teachers and parents was a strong feature of this kindergarten. Prior to the present study, parents had been surveyed for feedback about teaching and learning. Their comments were taken into account in trialling the small group teaching sessions that increased subject content learning opportunities in relation to the excursion during the participant observation period of the study. In addition, parents had specific input into curriculum planning when their child was a focus child.

Summary

Teachers', parents' and children's beliefs about subject content knowledge

The first three research questions were to establish the beliefs about subject content knowledge held by teachers, parents and children in early childhood education. The teachers in the present study believed that having a good general knowledge of subjects, obtained from education and life experience, was important to be able to respond to children's wide range of interests in both planned and spontaneous interactions. They believed that accessing specialist subject knowledge to support planned learning experiences, such as small group teaching sessions and excursions, was crucial to extend children's learning.

Parents' beliefs about subject knowledge were similar to teachers. There was widespread agreement that teachers and parents need broad subject knowledge to support children's interests and learning. Parents stressed literacy and science knowledge during the interviews. Literacy was spontaneously raised and clearly a concern related to advantaging children for later learning. It was likely that the science emphasis resulted from much discussion being related to the excursion.

Children revealed their knowledge and beliefs directly in the interviews and indirectly through their interactions and interests. Children's beliefs about teachers' knowledge focused on knowing the children as individuals and allowing children to initiate play experiences. However, in relation to the excursion, they stated an expectation that teachers would be able to talk knowledgeably about the sea creatures they would see. Subject-content based inquiry learning was common in spontaneous interactions with teachers and between peers, and founded on the children's interests and self-motivation.

This chapter has described the research findings within four themes. These themes were adapted from research studies on primary and secondary teaching (Grossman, 1990; Shulman, 1986; Wilson, Shulman & Richert, 1987) that developed categories of teacher knowledge. The results emphasise the study's focus on beliefs about subject content knowledge. However, teachers, parents and children in this kindergarten have revealed knowledge of pedagogy and philosophy, learners and context were significant influences on subject knowledge and how prominent subject knowledge was in teaching and learning interactions. The constructs of subject content knowledge, knowledge of pedagogy and philosophy, knowledge of learners and knowledge of context have proven to be useful in the present study in an early childhood education setting.

Informing curriculum and practice

The fourth research question investigated the ways beliefs about subject content knowledge informed early childhood curriculum and pedagogy. Given that curriculum planning and teaching interactions were their professional responsibility, it was not surprising to find that the teachers' beliefs had the strongest impact on curriculum and pedagogy. This is consistent with Kagan's (1992a) claim that teacher beliefs are perhaps the most important determinant of the teaching and learning children receive.

Teachers' beliefs supported the child-initiated, integrated curriculum and pedagogical approaches earlier described as discourse typical of early childhood philosophy. However, while stating the belief that subject knowledge was important in interactions, this did not always occur in practice. Moreover, curriculum planning and evaluation documentation did not emphasise this belief in subject knowledge. Some of the constraints on teaching practice have been described. Yet teachers acted on the belief that accessing specialist knowledge was necessary to support children's learning from the excursion. As a result of the research, these teachers recognised that their beliefs and practice in relation to subject content knowledge were not always congruent or documented. Kate stated that the research had made her consider subject content in the curriculum more overtly.

> *Kate - I think for me personally, it (the research) has made me quite self-reflective about what I'm doing ... each session. (As) self-appraisal... , what curriculum content am I putting out there as well, ... in a good way.*

This supports the awareness of the importance parents and children placed on subject content knowledge. All three teachers revealed during discussions of the study's findings

that the research had promoted reflection on their interactions with children and communication with parents in relation to subject knowledge within early childhood curriculum and pedagogy. Teachers have reported that acting on the research findings became a feature of their professional development after the research concluded (Billman, 2002).

Consideration of links between beliefs and practices has revealed congruence in planned teaching interactions, but not in relation to spontaneous teaching interactions. Discrepancies that occurred were related to the use of *Te Whāriki* as the tool for curriculum planning and evaluation, teachers' emphasis on cognitive skills rather than knowledge construction in spontaneous teaching interactions (also related to the emphases of *Te Whāriki*) and the constraints of group size. It has also been suggested that the research itself is likely to have had a positive impact on the beliefs-practice congruence with respect to subject knowledge related to the excursion in the present study.

Conclusions

The beliefs of the teachers and parents, and the interests and inquiries of the children in this study, support the view that subject knowledge was important. However, subject knowledge was underemphasised in spontaneous interactions that constituted most of the time children spent with teachers during the kindergarten session. Moreover, while the subject content of children's learning has been found to be significant, it was rarely included in documentation used to support and justify curriculum and teaching practice to parents and agencies such as ERO. Subject content knowledge was intertwined through some aspects of the curriculum in this kindergarten. This supports the notion of integrated curriculum and the weaving concept seen as underpinning *Te Whāriki*. However, it was commonly underemphasised in the spontaneous teaching and learning interactions that form the majority of children's experiences during each kindergarten session. The data presented in this chapter provide strong support for the view that subject knowledge can add depth and substance to children's learning. Subject knowledge perhaps requires the more explicit acknowledgement of its significance in early childhood education, as is accorded it in other education sectors.

Table 4.1 Summary of beliefs and practices within categories of teacher knowledge

Subject content knowledge – factual and conceptual knowledge; general knowledge

Beliefs	Practices
• Teachers believed that having a good general knowledge of subjects, obtained from general (school) education and life experience was important to support children's interests and learning. • Parents believed that broad subject knowledge was important for both teachers and parents. • Children believed that teachers need to keep them safe firstly, then use their existing knowledge to assist their learning.	• Teachers used a range of general knowledge in some spontaneous teaching interactions with children eg., discovery of a dead bird. Subject knowledge was underemphasised in other spontaneous teaching interactions. • Portfolios included accounts of children's learning based on their interests. These are related to strands and goals of *Te Whāriki*, and underemphasised subject content learning. • Planning and evaluation (based on *Te Whāriki*) did not reflect an emphasis on subject knowledge.

Subject content knowledge – factual and conceptual knowledge; specialised knowledge

Beliefs	Practices
• Teachers believed that accessing specialist subject knowledge to support planned learning experiences, such as the excursion and the small group teaching episodes, was important. • Parents also believed that accessing specialist subject knowledge to support planned learning experiences, such as the excursion, was important. • Children believed teachers should be knowledgeable about the excursion. Children revealed a range of specialist knowledge and interests.	• Teachers used specialist knowledge in planned teaching interactions with children eg., classification of species of sharks and dinosaurs. • Teachers recognised the importance of accessing specialist knowledge for purposeful teaching. • Subject knowledge was underemphasised in spontaneous teaching interactions. • Planning and evaluation based on *Te Whāriki* did not reflect an emphasis on subject content knowledge • Children expected teachers and parents to have content knowledge to answer their questions. • The excursion promoted extension of children's knowledge and interests and stimulated new interests for other children. These were documented for focus children only.

Knowledge of pedagogy and philosophy – effective learning and teaching processes in planned and spontaneous interactions

Beliefs	Practices
• Teachers believed that play-based opportunities based on children's interests provided teaching opportunities. Teachers described informal teaching styles. • Teachers' consideration of subject knowledge in teaching led to identification of pedagogical content knowledge. • Some parents understood that play was important as a pedagogical approach. Other parents viewed teaching and learning as more structured than kindergarten experiences. • Parents believed that both parents and children also had a role to play in constructing knowledge with children. However, some parents believed that children are more responsive to teachers. • Children believed teachers, parents and children were sources of knowledge and teaching.	• Subject knowledge was used in planned teaching situations, but underemphasised in spontaneous teaching interactions. • Teachers' interactions reflected an emphasis promoting skills such as thinking, reasoning and problem-solving rather than knowledge construction. • Small group teaching sessions were being trialled and evaluated. • Parents' interactions reflect an emphasis on content learning and beliefs about the importance of literacy development.

Knowledge of learners – individual interests, capabilities and learning preferences

Beliefs	Practices
• Teachers believed that knowing children's interests is important in building relationships and planning curriculum to extend their knowledge and interests further. • Parents believed that teachers' knowledge of children as individuals, and children's interests and learning styles was important in extending their knowledge and interests further. They were enthusiastic about their children's portfolios. • Children believed that teachers need to know the children they teach. Children were aware of the significance of portfolios as a record of their learning.	• Planning, assessment and teaching interactions were based on children's interests. Portfolios included accounts of children's interests and knowledge. • The excursion was planned to build on the knowledge and interests of focus children. Interest and knowledge was stimulated for several other children as a result of the excursion experience. • Portfolios were used as a communication tool with parents. Parents were involved in planning and evaluation.

Knowledge of context – setting, organisational systems and culture, knowledge of families and community

Beliefs	Practices
Group size • Teachers believed that group size was a constraint on opportunities to construct knowledge with children and extend their learning. • Parents believed that group size was a constraint on both teachers' work with children and their own opportunities to interact with their own children when they assisted at kindergarten. They spoke enthusiastically of the small group teaching sessions. • Children did not feel restricted by teachers or the environment, but thought that the number of children might be a reason why there were some restrictions.	• Small group teaching at the beginning of each session has been introduced as an opportunity for more focused and sustained learning. Sometimes this utilises teachers' subject knowledge. These sessions were planned and evaluated informally and not documented.
Kindergarten/junior primary • Teachers believed that both the curriculum and the pedagogical approaches of primary school contrasted to that of kindergarten. They felt this was difficult for children as they transitioned between the environments. • Parents also believed that the curriculum and the pedagogical approaches of primary school contrasted to that of kindergarten and caused difficulty for children as they transitioned between the environments • Children believed that primary school would be more formal than kindergarten. The status of "being nearly five" was a strong learning orientation as they prepared to transition.	• Small group teaching at the beginning of each session has been introduced as a more focused teaching approach. • Large group mat times occurred at the end of each session. These were used as opportunities for reading, singing and reminding children of group responsibilities. • School "preparation" such as early literacy occurred within the normal context of learning experiences, but was not always documented.

Chapter Five

RESULTS AND DISCUSSION: A SOCIOCULTURAL ANALYSIS

"Early childhood curriculum cannot exist unless a community gives it meaning and evolves it in into existence" (Fleer, 2001, p.10). The aims of this study were to explore beliefs about subject content knowledge held by teachers, parents and children involved in one kindergarten community and to identify links between beliefs and practice. This chapter reflects on the data further to highlight how a sociocultural perspective enriches and extends the perspective of subject content knowledge and learning in early childhood curriculum and pedagogy.

To support a sociocultural interpretation, concepts of learning communities are applied, and pedagogical relationships described, which highlight approaches that promote and support active, collaborative engagement in meaningful inquiry. The pedagogical relationships that frame the analysis occurred between children and teachers, children and parents, child peers, children and the researcher, and among both the group of teachers and the group of participant parents. Consideration of the knowledge base of early childhood teachers is then revisited, and progression and continuity issues in the early years raised.

Socially-constructed learning in communities

The theoretical assumption that underpins this chapter is that learning is primarily socially-constructed and occurs as a result of dynamic and active engagement. Accumulated knowledge that results is shared and culturally valued. Wells (2001b) states that "knowledge building takes place between people doing things together" (p. 186). *Te Whāriki* supports this view of learning in describing it as occurring through responsive and reciprocal relationships with people, places and things.

Contemporary sociocultural theories of learning and teaching have involved the notion of a learning community. One parent commented that the excursion was an opportunity to be seen as a learning community.

> *Lucy - It is a real community view isn't it? Like when we're all out there together, we're (name of) Kindergarten, apart from what they (children) see and learn in the actual place.*

Wenger's (1998) concept of a community of practice sites learning within the contexts of social experience that occur in daily human life. Active participation in meaning-making through participation in the experiences and practices of knowledge communities results in a sense of personal and community identity. The excursion was an example of a meaning-making social experience for members of the kindergarten community. Lucy's comment reflects Wenger's (1998) idea that an outcome of a community of practice is a sense of identity. Wenger sees the concept of identity as a pivot between the social and the individual in appropriating learning.

Children's social construction of knowledge

Socially-constructed learning provides a more contemporary lens than developmentally appropriate practice through which to view children's learning and development. The impact of children's social interactions on their cognitive development has only recently been emphasised (Rogoff, 1998). From this view, learning takes into account accumulated shared knowledge and requires intersubjectivity. Findings of this study support that children's socially-constructed learning is situated in the context of wide social relationships, including with their parents and families and their child peers, and reflects the kinds of knowledge that is culturally-transmitted as well as valued. The following interactions taken from fieldnotes demonstrate this point.

Penguin 2 was sitting thoughtfully in the sandpit letting sand run through her fingers into a bowl. She initiated the following exchange with the researcher.

> *Penguin 2 - It's fairy sand, it does magic. It belongs to the fairies, they make it into magic for tooth fairy land.*
>
> *Researcher - Has the tooth fairy visited you?*
>
> *Penguin 2 - No, you have to have a fallen out tooth for that to happen.*
>
> *Researcher - When does this happen?*
>
> *Penguin 2 - When you are six. My friend (name) has wiggly teeth now because she got hers earlier than me. The tooth fairy has lots of teeth in fairyland. But she won't give me one because they are old teeth.*
>
> *Researcher - What happens when your tooth falls out?*
>
> *Penguin 2 - The tooth fairy comes, or is it just your Mum and Dad?*
>
> *Researcher - I'm not sure. How do you get another tooth?*
>
> *Penguin 2 - It just grows back, but it is bigger.*

Penguin 1 initiated a demonstration of knowledge of parenting skills. She accurately bathed a doll, imagining it to be her "baby". She was knowledgeable about the equipment required and the procedures that occurred, including safety considerations. In the process, she imagined that her "child" was preparing for a dancing class and recalled her experience of attending a ballet.

> *When I was about um two and three-quarters, we were going to go to ballet. But I*
> *thought, nah, I thought it would be quite boring. I seen ballet when I was two.*

Penguin 1's mother later confirmed Penguin 1's accounts of her dancing and ballet experiences, and that the child she had observed being bathed that she spoke of during the interaction was her cousin whom she saw frequently. Penguin 1's memory of attending a ballet when she was two was in keeping with research on children's memory capabilities (Hamond & Fivush, 1991; Butler, Gross & Hayne, 1995). Viewing children as capable is consistent with sociocultural perspectives of children as competent and confident learners.

In the interviews prior to the excursion, Penguin 1 and Orca realised through negotiating meaning that "Kelly" was a person's name.

> *Researcher - I just want to ask you one more question. Do you know why it's called*
> *Kelly Tarlton's Underwater World?*
> *Penguin 1 - No.*
> *Researcher - What do you think Kelly Tarlton is? What does that sound like?*
> *Penguin 1 - Kelly - name!*
> *Orca - I have a sister called Kelly (Kally was his sister's name).*
> *Researcher - That's right. So it's a person's name isn't it? Kelly Tarlton was a man*
> *so see what you can find out about him tomorrow too.*

Orca remembered to ask his mother about this person, and explained his understanding of the intention of the excursion venue in the post-excursion interview.

> *He dived, he went under water looking for treasures ... And he decided to make*
> *Kelly Tarlton's Underwater World, so um, adults who can't dive and children who*
> *can't swim (can) see what's under water.*

From a sociocultural perspective, the contribution of the social and cultural contexts in which children participate, and the role of cultural tools and events, such as excursions, therefore become prominent in considering how children's learning can be enhanced. For example, research studies have demonstrated how incorporation of aspects of children's

popular media culture experienced at home can be used to motivate and extend children's literacy learning in the centre setting (Arthur, 2001; Marsh, 2000). Marsh's study utilised children's interest in a television programme called "Teletubbies" to extend and promote participation in language and literacy experiences. In the present study, children devised and played their version of "Blues Clues", a television programme that encourages symbol recognition as an early literacy skill.

The excursion

The excursion undertaken as a feature of the present study is an example of experiential learning in an authentic context that also highlights the importance of prior preparation and the social construction of knowledge. One teacher commented:

> *Kate - Well I think it was a really valuable excursion. There was heaps and heaps of talking which is really neat. Parents were really focused, which was good. The children were focused. ... I felt the parents had a lot of background knowledge that maybe (they) might not have had on previous excursions.*

The following was a significant example of experiential and socially-constructed learning related to the excursion. The experience of the viewing tunnel and the travelator fascinated many children. Their discussion, writing and drawing after the excursion revealed both how powerful the glass tunnel was as a learning experience, yet also how the tunnel did not appear to fit their prior knowledge of the world. Several drew pictures depicting the experience of the glass tunnel. One drew a close-up picture of a stingray and said, "the stingray kissed me". Several children drew pictures that reversed the placement of the tunnel with people above the tunnel rather than surrounded by water. The children's experience perhaps appeared inconsistent with their prior conceptual understanding of the world, but may also have been affected by their representational ability. Further experience of such an anomaly and exploration of specific subject knowledge related to the experience would be required for conceptual change to occur (Watson, L., 1997).

As noted earlier, Bunny had previously visited the venue and recalled her experience of the travelator. It had dominated her experience of the viewing tunnel to the point where she said she had seen "nothing" on that occasion. After the excursion, she revealed that her experience was less dominated by the travelator this time, but that she and Frankenstein continued to be nervous about the tunnel.

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Researcher - What did you think about being in the tunnel?

Bunny - Scared.

Researcher - Why were you scared?

Bunny - Because I thought the wobbegong and the stingray could get, I thought it could open its mouth and eat the glass and sting me.

Researcher - ... If you look at the glass in the tunnel, do you think the water could really get through?

Bunny - No.

Researcher - Why not?

Frankenstein - What if there was what if there was heaps of water?

Researcher - There is heaps of water there isn't there?

Frankenstein - What if there was even more?

Researcher - I guess they'd have to ... make sure it was strong enough wouldn't they?

Frankenstein - But what if it blasted right out?

Shark had also asked his mother how the glass could be thick enough to hold all the water (see p. 82). Reflection with a knowledgeable adult or peer may further assist conceptual learning for Shark, Frankenstein and Bunny, assuming that sufficient inquiry occurs into the principles of engineering to explain the tunnel's construction, and that the dialogue is at the children's level of understanding. Again, the importance of teachers' pedagogical content knowledge is raised within early childhood education.

Dewey (1938) placed inquiry at the core of meaningful curriculum. The concept of a community of inquiry (Wells, 2001a) arose from researchers observing the importance of children's real questions and ways in which these questions were responded to in determining meaningful learning. Wells (2001b) claims that dialogue is "the discourse of knowledge building" (p. 185). This claim is consistent with the notion of socially-constructed learning and again, the importance of reciprocal and responsive relationships becomes highlighted in order to create and sustain a community of inquiry.

Teachers, parents and children believed the excursion provided the opportunity to experience in reality what had been read about in books and to answer children's inquiries about sea creatures. In addition, more children's interests and knowledge were stimulated. One teacher, Shaina commented:

Afterwards, it did spark a lot of discussion with some of the children, ... When they came back, and we looked at the photos, ... they were more aware of what was what. They were able to tell me (names of species). ... and they actually could describe to me what it was like to hold a starfish. They described that it was prickly and rough. So that really descriptive language came out.

The opportunity to hold turtles and starfish were specific examples of sensory experiential learning experiences. In post-excursion interviews, while looking at photographs, children recalled and described this experience, drawing on their existing knowledge and language.

Researcher - Do you remember what the turtle felt like?

Shark - It felt like yucky.

Researcher - What was yucky about it?

Shark - It had colours on its face.

Researcher - Didn't you like the look of the colours?

Shark - I don't like that.

Researcher - Did you remember what it felt like?

Shark - No.

Researcher - Did you touch it?

Shark - Yeah.

Researcher - What did it feel on your hand when you touched it?

Shark - It felt like a jumping frog.

Researcher - And what did the turtle feel like?

Bunny - Hard at the bottom.

Frankenstein - It feeled like concrete.

Researcher - It felt like concrete did it?

Bunny - It was hard at the top and the bottom.

Researcher - Hard at the top because it had a big shell on top? But you thought it was hard at the bottom too Bunny? Did it sit on your hand?

Bunny - Yeah. I didn't know what it feeled like but now I know.

Bunny also drew on her newly-learned knowledge of turtles to respond to further questions.

Researcher - And what did the starfish feel like when you touched it Bunny?

Bunny - It feeled like a turtle.

Researcher - And what did you think the turtle felt like? Tell me again?

Bunny - ... The starfish was hard on the top and hard underneath too, but I saw its
mouth when I tipped it upside down.
Researcher - Oh yes, what did its mouth look like?
Bunny - It looked like a (makes upturned grumpy face with lips) maybe it was sad.
Researcher - A grumpy look with its lip up?
Bunny - No, because I saw little drips because I saw tears over its face so maybe it
was sad.
Researcher - Oh okay maybe it was wet because you'd picked it up out of the water?
Bunny - No cos I heard it go (crying noises).
Researcher - Oh did it make sad noises too did it?
Bunny - Yeah so maybe it was sad.

Bunny has interpreted the water dripping from the starfish's face as tears, ascribing to it
human qualities. She will need time and further experiences to challenge and address this
misconception. Social interactions play an important role in children's development of
scientific concepts (Fleer, 1991; Watson, L., 1997). Teachers need subject knowledge and
pedagogical strategies that enable children to restructure their existing conceptual
knowledge to take account of new experiences and information, further highlighting the
role of teachers' pedagogical content knowledge in early childhood education. This
excerpt also demonstrates that Bunny felt confident about denying the researcher's
interpretations of her comments and asserting her own.

Pramling Samuelsson and Mardsjo (1998) promote an experience-orientated approach for
maximising children's learning. They analysed dialogues to investigate both children's
learning of nature and how teachers used nature as content while integrating other learning
such as early literacy, mathematics and social sciences. This is resonant of Dewey's
(1938) argument that education should be based on the experiences of the learner and lead
to subject knowledge. Pramling Samuelsson and Mardsjo demonstrated that teachers must
be aware of children's prior knowledge and how they approach tasks and problems. Their
major conclusion can be interpreted that the interaction between teachers teaching and
children's experience was based on a mix of intersubjectivity, knowledge of learners and
pedagogical content knowledge, although those terms are not specifically utilised in this
study. An experience-oriented approach to young children's education therefore links the
two theories used to interpret and analyse the present study's findings: categories of
teacher knowledge and sociocultural theory.

A community of learners (Rogoff, Matusov & White, 1996) emphasises that learning is a collaborative participation in shared experiences. It stresses that intersubjectivity, earlier defined as mutual or shared understanding among individuals, is required for active and meaningful learning and teaching. Its underlying theoretical assumption is that "learning is a process of transformation of participation in which both adults and children contribute support and direction in shared endeavours" (p. 389). The excursion was such a collaborative, shared experiential learning opportunity for the kindergarten community.

Teachers' and parents' learning

In relation to the excursion, Shaina commented *"It's been a learning thing for me too".* While it was likely that she was referring to subject knowledge at that time, the excursion, and the research occurring, promoted extended discussion among the teachers about their approaches to curriculum and pedagogy and encouraged reflection of the beliefs underlying their practices. They commented that they rarely made the opportunity to have these kinds of discussions in the day-to-day business of fulfilling their roles as teachers.

The teachers shared the following about being early childhood teachers.

Mary - I think for us, it is not so easily identifiable, what we actually do because it is like the foundation.

Researcher - So who is it not identifiable to?

Mary - Well ... at school they do tests and things, and then they can say, well yes, they've learnt that now and yes they've learnt that now and a little tick. I think a lot of what we do isn't so obvious.

Kate - Tangible.

Mary - Would you agree?

Shaina - It's not a yes or no thing children's learning.

Mary - It's not so, it just happens.

Kate - I think also, we're evolving all the time and we are continuing with our education so there's no one right or wrong way all the time. And we are willing to build on our knowledge as well. Although we have that core understanding of child development and what we believe in our philosophy, I think we are always willing to learn new things and to listen to parents as well, being their child's first educator, and valuing their input as well. So I think, yeah, there's nothing stagnant about teaching.

As a specific example of reflection prompted by the research process, Kate noted that for children, problem-solving needs to be purposeful and meaningful. During a planned small group teaching episode, Kate had a large concrete brick, and posed to the children the problem of *"How do we get the brick on to the table?"* The children theorised and tried out several strategies involving lifting, a ramp and pulleys. Penguin 2 then asked, *"Why do we need the brick on the table?"* Kate later reflected that Penguin 2's question was a good reminder to her that *"learning has to be relevant"*.

Awareness of the subject knowledge children had learned, and pedagogical strategies employed by teachers and parents to promote this, were revealed in the post-excursion interviews and their diaries. The research also encouraged parents to reflect on these interactions with their children. Penguin 1 asked her mother to read her something one morning.

> *Sue - I was having my breakfast at the time, and I would normally say just go and get dressed, and I thought no, got to do this for (name of researcher). So I actually did it, I was very proud of myself.*
>
> *Jo - I did actually discover, ... that I talk heaps. That he doesn't actually ask lots and lots of questions, more that ... when he ... comes out with a piece of information that I ... take it and run with it, and we ... discuss lots of things ... promptings, rather than always questions. ... That was a self-discovery thing.*

Konzal (2001) noted that an additional benefit of using parent diaries in her study was to improve parent-child interactions as a result of the increased parental awareness. Similarly, this research process appears to have promoted understanding and reflection on their interaction styles for Sue and Jo.

Sue also followed up on discussion with Lucy in expressing that she would like to have known more about links between play and learning. Initially, she appears to have seen play and learning as quite separate, unrelated concepts. Lucy has helped her see the importance of play in developing the ability to write.

> *Sue - At school they ... do exercises every morning, ... they are going to start doing these movements with the upper body, ... helps with the writing skills.*
>
> *Researcher - Right. Lucy was talking about those last week ...*
>
> *Sue - Right ... So what they do do here is important.*

Lucy - (Yes), because the development comes from this way down, so you have to have ... a stable base to work from.

Sue - You're not actually taught that (as a parent), ... you don't even stop to think about (play). I didn't know they had to build their strength up here as well (pointed to upper arm), maybe I haven't realised the importance of play. ... I didn't realise that it had that much of an impact.

Sue's daughter, Penguin 1 demonstrated that writing was a strength developed due to her interest in writing her name, stories and shopping lists, among the opportunities within the teachers' provision of a range of early literacy experiences, and her attendance at phonics classes. Penguin 1 was a confident learner and explorer in the kindergarten environment. However, Sue had only just realised the potential and value of play for her daughter's learning due to this opportunity to discuss beliefs with other parents and socially construct a new understanding of play.

Parents expressed beliefs in children's willingness to learn, and concern that their children were not disadvantaged academically was also expressed.

Sue - Most parents in that respect too, they say well they're only little, let them play. But if they are willing to learn it, I sort of think, why not, ... You'd like them to be able to read and write a bit before they get to school, and count a little bit, and learn to swim before they get there because you don't want them to be left behind.

Sue acted on her beliefs as Penguin 1 attended phonics classes. However, when Penguin 1 talked about these classes, she did not reveal anything related to the purpose of phonics, that is, letter-sound relationships, but her broader interest in reading and writing.

Researcher - What do you learn at phonics classes?

Penguin 1 - Learn to write.

Researcher - Learn to write. What else?

Penguin 1 - Mmm you get a story sometimes.

Researcher - What do you do with the story?

Penguin 1 - You've gotta read it at home and then bring it back when you go back to phonics again.

Researcher - So do you think that's helping you learn to read and write?

Penguin 1 - Mmm.

Making children's subject-related learning at kindergarten explicit to parents may alleviate parental concern about kindergarten not providing such experiences, and parents feeling that children need to attend additional classes. Moreover, as Rogoff et al. (1996) suggest, adopting a complementary "and" approach to play and structured academic learning, rather than viewing them as mutually opposing, offers a new perspective. This perspective may assist in describing reasons for findings such as those of Marcon (2002) and Wylie, Thompson and Lythe (2001), that play-based, integrated curricula enacted by thoughtful, knowledgeable professionals can lead to long-term academic learning outcomes.

Carr and Kemmis (1983) argue that teacher knowledge is socially constructed and that understanding it is crucial to understanding education as "praxis": shared reflection and informed action on the world in order to change it. Maynard's (1996) and Ure and Raban's (2001) studies included evidence that discussions promoted reflection on knowledge and teaching practice. In the present study, providing opportunities for teachers and parents to explore their thinking through the shared experience of focus group discussions contributed to a sharing of beliefs and knowledge, greater awareness of some participants' beliefs, consideration of beliefs in light of teaching or parenting practices, and in some cases, collaborative construction of new understanding and knowledge that may become beliefs.

Relationship-based pedagogy in early childhood education

Within learning communities, intersubjectivity between teachers and learners, that is, the cognitive and affective components of a mutual and close relationship, is necessary. Dahlberg, Moss and Pence (1999) and Malaguzzi (1993) see relationships and communication as central to children's socially-constructed learning. A relationship approach to pedagogy consistent with a sociocultural perspective supports that inquiry learning and co-constructing knowledge are processes of meaning-making (Dahlberg et al., 1999) or negotiating meaning (Wenger, 1998) through intelligent and informed interactions. Four pedagogical relationships, where intersubjectivity was important, and that provide further evidence of socially-constructed learning, were evident in this study. These relationships occurred between teachers and children, parents and children, between child peers, and between children and the researcher in a teaching role.

Teachers and children

Penguin 1's belief about teachers' knowledge for the trip was:

To know about you don't let the kids run away from you.

With regard to kindergarten teachers' knowledge base Penguin 1 stated:

That you're going to have to look after your kids very goodly and make sure they don't go out the gate.

For children, being known to the teachers and feeling safe was a precursor to exploration and learning. Theory and research indicate that young children are not open to learning opportunities unless their need for physical safety and the emotional closeness of relationships is met. The relevance of attachment theory developed by Erikson and Rogers, who argued that emotional and social development was a necessary forerunner to academic learning, is highlighted. Howes and Smith (1995) researched links between children's emotional security, creative play and cognitive activities. Their findings accord with these beliefs: that if children feel secure, they will explore confidently and improve cognitive learning outcomes.

With regard to Penguin 1's beliefs, one safety issue that arose during the research period concerned a child attempting to climb a fence to retrieve a ball. Kate used the large group teaching time ("mat-time") to reinforce safety.

Kate tells the children she is not very happy today and describes what happened. She asks the children "Do we throw balls over the fence at kindy?" Chorus "No." "Do we climb the fence at kindy?" Chorus "No." "What might happen?" Children respond: "There's a road there and you might get run over." "You might land on your head and have to go to hospital." "You might get lost." Kate "What should you do if a ball goes over the fence?" Starfish "Tell a teacher." Kate "Yes, quickly. What should you do if you see someone climb a fence?" Chorus "Tell a teacher." Kate "We need to keep safe at kindy." (fieldnotes)

Berk and Winsler (1995) advocate for a sociocultural approach to pedagogy and curriculum that focuses on purposeful relationships and communication between teachers and children. Children recognised that teachers possessed knowledge and skills that children could access for their learning.

Researcher - So how do the kindy teachers help you learn to write?

Penguin 1 - Cause they already know how to write.

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Rinaldi (1994) notes that teachers should always focus on how and what children can learn from particular experiences. The "how" could be interpreted as the pedagogical approach and the "what" as the knowledge that results. In the present study teachers and parents described a range of knowledge children gained through the excursion, described earlier. Teachers' discussion about interactions at the kindergarten occasionally mentioned knowledge, but focused more on the pedagogical strategies used.

> *Kate - It's really important to be teaching through facilitating.*
>
> *Researcher - What are you facilitating, children or their activities?*
>
> *Kate - Their (children's) learning, and taking from their interests. Things that they are good at, and building and extending on those things.*

One parent, Lucy, accurately described understanding of this approach with her daughter.

> *(Her learning) was by experimenting and asking questions and so they pointed her in the direction of different things or encouraged her to ask questions.*

Shaina discussed how teachers can use their knowledge, interest and skill across the curriculum in an integrated way to promote language and literacy learning purposefully, using her own passion for music as an example.

> *... how to put music into so many different areas of the curriculum. It doesn't just have to be with instruments. It can be with stones outside, tapping, making the different noises, ... Another connection that that does make to language as well, is if they can't differentiate between nails and ... sand, they won't necessarily be able to differentiate between a "p" or a "b".*

As an important skill and strategy for future learning, parents and teachers stated that adults should not always have "the answers" but encourage children to access knowledge for themselves. Rather than answering children's content-related questions directly, parents discussed alternatives that they could use at Kelly Tarlton's, for example:

> *Lucy - Guide them, or asking them to think about it, what does it look like?*

The teachers supported this in their beliefs.

> *Kate - We can show children that we need to find things out too, and that learning with them comes back to their partnership, and let's find out together. ... And a lot of the time too, you might have the knowledge, but you want the child to discover it for themselves.*

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The kind of approach Kate advocated here also allows the planning of opportunities to develop skill in the use of cultural tools, such as books and visual aids, to contribute to the knowledge-building process.

Parents and children

Parents supported children's learning through listening to children, answering their questions, and provision of learning resources for content knowledge. Parents showed understanding of their children's interests and learning preferences. Some children recognised parents as sources of knowledge.

> *Orca - Mum told me. ... Well my mum said...*
>
> *Penguin 2 - Mum said ... . Why did Orca's Mum say... ?*

When discussing subjects, parents commonly emphasised a belief in the importance of literacy. Some parents discussed the strategies they have used to teach reading and writing skills, such as use of magnetic letters, writing stories and names, and use of media-advertised, commercially-produced "early reading and writing kits" aimed at parents. However, some parents felt that children were not as responsive to their efforts to teach them as the children are to teachers.

> *Eve - They get fed up with us trying to teach them.*

This may relate to the cultural tools used to teach literacy, perceptions of "teaching" or the didactic approach described by several parents. Meade (1997) points out that early childhood researchers and teachers have warned against use of didactic approaches as they do not stress children's construction of their own knowledge and understanding. Meade also suggests that parents need to be educated about appropriate approaches to young children's learning used in early childhood centres. Supporting parents' understanding of appropriate approaches to children's learning utilised by the teachers in this kindergarten would enhance shared understandings, relationships and practices in this community of practice with regard to the philosophy and goals of early childhood education.

As noted earlier, in relation to subject content learning, Jo expressed the following:

> *You kind of limit their (children's) learning, by relating to them as a pre-schooler I*
> *suppose. ... They can actually take in a lot more factual information than what you*
> *... give them credit for.*

Jo acted on her belief and described her approach as:

>*He ... comes out with a piece of information that I ... take it and run with it, and we*
>*... discuss lots of things.*

This was evident in the information Orca shared with teachers and peers, and resources, such as pictures of sea creatures from the Internet, that he brought to the kindergarten. In this regard, Palacios, González and Moreno (1992) investigated the links between parents' beliefs and parental education practices. They found beliefs and practices to be largely coherent. Parents who expressed strong beliefs in children's capabilities interacted with them accordingly. Jo demonstrated similar coherence in this study. Moreover, evidence from Orca's portfolio illustrated that communication between home and kindergarten had enhanced his conceptual learning and development of cognitive skills. Two other parents, Lucy and Cara, also demonstrated similar coherence both in earlier discussions of responses to inquiries initiated by their children, and in their attitudes and approaches to teaching literacy.

Learning among child peers

Researchers have demonstrated that there are far more peer interactions than teacher-child interactions in many early childhood settings. Two reasons identified are high teacher-child ratios and large group sizes (Kontos & Wilcox-Herzog, 1997). In the present study, children showed awareness of peers and older siblings as a source of learning. Sue revealed that Penguin 1 had her brother read information to her and that Penguin 1 was teaching other children to write.

>*Sue - She was talking to Chris about Kelly Tarlton's, and they came out with Chris's*
>*first encyclopaedia, and she found all the things that she thought she might see there,*
>*and asked him to read ..., a little bit about the penguins and the sharks and things*
>*like that. ... She's busy helping other children write apparently, which made her feel*
>*important.*

Orca was recognised as a potential source of knowledge in relation to sharks.

>*Penguin 2 - Why does it eat people?*
>*Researcher - I don't know. Shall we try and find that out tomorrow too?*
>*Penguin 2 - Shall we ask Orca why?*
>*Orca - Yes, well, only the great white sharks eat people because ... the people mostly*
>*try to kill that shark.*

Classification of different species of shark was a shared learning interest among several children. One teacher, Shaina, noted that while children were watching a video of sea creatures after the excursion without an adult present, discussion occurred between them. Children negotiated and explained their understanding of sharks and whales and their food preferences (see appendix 9). Another teacher, Kate, supported this, explaining that the children initiated use of small-scale plastic accurate reproductions of sea creatures as tools for classification, lining these up in front of the television screen to assist identification.

The children in this study recognised their peers as sources of information, and also utilised peer-tutoring. Fieldnotes recorded many occasions of peer-tutoring resulting from children's expertise in skills and/or knowledge. Penguin 3 scaffolded a peer's ability to make a fan (see appendix 10). Further examples included building the Sky Tower with blocks and Lego, collage construction techniques, screenprinting, and making yo-yos and small bouquets of flowers. This lends support to the community of learners notion of active learners working with more skilled partners, but highlights interactions between child peers, rather than adults and children as is emphasised in Rogoff et al.'s (1996) discussion.

The researcher and children

As previously stated, the researcher adopted the role of a complete participant (Gold, 1958, cited in Merriam, 1998) in terms of acting as a teacher. The children in the research group spent their small group teaching time with the researcher for two weeks, one prior to the excursion and one following the excursion. In addition to conducting the research interviews, preparatory experiences for the excursion were undertaken similar to those of the three teachers. The following excerpt also provides further evidence of Frankenstein's knowledge of maps and Penguin 1's ability to read.

> *Researcher - I've got some books here that you might like to look at to see if you can find out some more things that you'd like to look at tomorrow.*
>
> *Frankenstein - Look what I found!*
>
> *Researcher - Ah! What does that map tell us?*
>
> *Frankenstein - Where they go?*
>
> *Researcher - Where the whales live and where they go to, yes. It says in here (pointing) that these are migration routes. That's where they go in winter.*
>
> *Penguin 1 - Look at that! (name of researcher)! I know those letters, it says 'sharks'.*

The researcher's participant observation interactions with children frequently assumed a teaching role. Several children sought the researcher out to participate with them. Penguin 2 did so regularly in her dramatic play, scientific investigations and literacy activities. Penguin 1 learned about daffodils as a follow-up to her interest in flowers. The researcher got to know the participant children well, therefore was also able to pick up on unreturning moments. Kitten's knowledge and interest in cars has been described. One morning, he left his small group time early and was peering at something he produced from his pocket.

> *Kitten tells me he found this thing on the ground and that it sticks to things. I ask him what sort of things and he replies "dark things." I suggest we go and see if there is anything that it will stick to in the kitchen. He successfully tries the fridge and the dishwasher. I ask him whether they are dark and he replies "no, white." I ask him what he thinks the doors of the fridge and the dishwasher are made of and he frowns "I don't know". He discovers the magnet attaches to the door-frame, then the stapler in the collage area. He stops to think and says "Let's go outside and find a hammer." He runs to the carpentry area and tests out his theory. "Yes!" He quickly finds several other things that the magnet attaches to. I ask him again what these things are made of, and suggest it may be the same material as cars. His face brightens in realisation. "Let's see what else is metal at kindy!" He finds several more items the magnet attaches to. I ask him how a magnet works. "I don't know, let's look for some more metal." ... I ask him what he thinks makes them stick together. Kitten "I don't know." I suggest we find a book about magnets. Kitten runs inside to the container of books and we find a book. We read about poles, force and pull. ... We return to the kitchen to see if we can feel the pull of the magnet. Penguin 2 has joined us and Kitten shows and tells her how magnets work. (fieldnotes)*

Had the researcher not been present as a "teacher", this was likely to be an unreturning moment that otherwise would have been missed as the three teachers were with their small groups. It is also an example of how children's prior knowledge and intersubjectivity between adults and children can promote inquiry and lead to construction of new subject knowledge. Early childhood teaching that promotes knowledge construction is not confined to planned experiences such as the excursion or small group teaching undertaken during the present study. In a play-based, child-initiated curriculum, teaching occurs mainly within spontaneous interactions that arise from and respond to children's interests and inquiries.

Maximising children's socially-constructed learning

Children's participation in play experiences does not in itself ensure learning. Sociocultural theories support a complex model of teaching and learning. These theories imply a proactive role for the teacher in both creating a challenging learning environment for young children and having the knowledge and skills to engage in effective teaching that extends learning during children's play (Hedges, 2000). Firstly, if not invited in by children, a teacher's priority is to sensitively recognise the critical moment to enter children's play to provide teaching and challenge. Language, including questioning techniques, and appropriate pedagogical strategies then become crucial in determining if children's experiences will lead to meaningful learning.

The significance of dialogue

The pedagogical relationships described in the preceding sections demonstrate the importance of intersubjectivity between the participants and an environment that fosters open inquiry. In particular, the kinds of dialogue exemplified in the examples related to the excursion in the present study, provide strong support for the application of the notion of a community of inquiry in the early childhood context. Wells (2001b) describes how dialogue takes on a crucial mediating role. Participants have to interpret each others' contributions and make sense of them in order to contribute further to increased shared learning and understanding. Evidence of children socially-constructing meaning and challenging and clarifying subject knowledge collaboratively was evident in the following exchange.

> *Shark - I once saw Kelly Tarlton's and I saw a hammerhead dolphin.*
>
> *Researcher - A hammerhead dolphin?*
>
> *Shark - Yeah.*
>
> *Penguin 2 - I never heard of a hammerhead dolphin. There's a hammerhead shark. Is that a hammerhead shark? (looking in a book)*
>
> *Orca - It's the wobbegong!*

Likewise, in an effort to explain oneself clearly to others, those engaging in dialogue often reaches a deeper understanding of both knowledge (Wells, 2001b) and the processes of teaching and learning (Rogoff et al., 1996). While Wells states that knowledge building also takes place through the written mode, the primacy of dialogue between people is fundamental to the concept of inquiry.

The excursion is a prime example of meaningful inquiry learning based around children's real questions and interests. Moreover, dialogue is likely to be kindergarten children's principal learning mechanism as they are not yet capable of accessing written material in other cultural tools such as books and the Internet without the intermediary influence of adults' or more skilled peers' interpretation. "(W)e have to engage in meaningful activities with others, using the relevant texts, tools and practices, in order to come to understand them. It is for this reason that we place such an emphasis on inquiry as a means of learning and coming to know" (Wells, 2001b, p. 187). Furthermore, dialogue plays an important role in "inner speech", Vygotsky's (1986) term for talking to oneself. Children were frequently observed talking themselves through experiences, such as problem-solving the completion of a puzzle or matching pictures and symbols in mathematical games, including when engaged in the puzzle or game with others.

Learning and teaching through play

As discussed earlier, teachers' beliefs reflected the prominence of children's self-selected play as the medium for meaningful teaching in early childhood education.

> *Kate - I think you can teach a variety of things through a variety of different activities. ... Just like literacy skills and numeracy skills, done through a variety of activities. It can be done in the sandpit, it can be done through the car game, it just depends what the child is interested in ... . It is their choice.*

Early childhood in New Zealand has until recently shied away from the word "teacher", instead using terms such as "educators" (Ministry of Education, 1996, 1998, 1999) or "practitioners" (Carr, 2001a), perhaps recognising that not all those teaching children have teaching qualifications. Although degree-qualified themselves, the teachers' beliefs in this study perhaps reflected this reluctance to use the word "teacher" to describe their role. In discussing pedagogical strategies, Kate preferred the term "facilitating" to "teaching".

Dunkin (2001) uses the term facilitator to describe sustaining children's play by providing strategies and ideas to extend their thinking and reasoning, providing opportunities for children to perform tasks for themselves and to make their own decisions, giving children the time to follow through on a task or decision, and supporting children in the development of recall and reflection skills. In order to maximise children's opportunities, Dunkin states that knowledge of the child as a learner, and the child's home, community and culture are important. This view of facilitation is consistent with a sociocultural

perspective and highlights a number of important teaching skills. However, it neglects the contribution of children's prior knowledge to the new learning situation and children's interest in subject content learning. If sustaining children's play is viewed as the priority of the teacher's role, then it is likely that children's prior knowledge, and the contribution of teachers' subject knowledge in choosing appropriate pedagogical processes, will be key factors in determining whether or not meaningful learning and teaching occurs.

Mary initially also appeared reluctant to own the concept of teaching.

> *Teaching to me is ..., extending children, like with their ideas and things. Helping them to clarify their thinking ... . I don't know if I like to call it teaching them (children) those things, though, but I guess it is.*

Later, she noted that it was important for early childhood teachers as professionals to be able to explain how they teach. Mary's status as a first year teacher impacted on her beliefs and practices. She was aware that she was adapting and learning from the more experienced teachers, especially Kate, and gaining confidence in herself.

> *I learn so much from watching these two.*

Mary's comment also further supports the notion of a community of practice existing among these teachers, where learning is commonly shared through observation and apprenticeship.

In a learning community, participation in meaningful dialogue promotes learning and understanding on a range of levels for all participants. An emphasis on participation has implications for what it means to experience and sustain learning. These invite a reconceptualisation of practices that on the surface appear dichotomous and conflicting, such as emphasising play-based or subject-based curriculum and child-centred or teacher-centred pedagogical approaches. According to Wenger (1998), taken-for-granted practices can be reified, and often result in slogans that can constrict practice and discourage understanding and critique of underlying beliefs. In the present study "learning through play" and "developmentally appropriate practice" could be considered examples of reified practices that underemphasise pedagogical dialogue. Finding ways to increase opportunities for dialogue to maximise pedagogical interactions is a key challenge for early childhood education. Wenger encourages communities to reconsider and re-negotiate meaningful practices.

Pedagogical approaches

Teachers need a range of flexible and useful pedagogical strategies at their fingertips to apply to the range of teaching and learning interactions they encounter (Hedges, 2000; MacNaughton & Williams, 1998). Marcon (1999) recommends that teachers work within a coherent theoretical framework in selecting teaching approaches and strategies. Within a sociocultural perspective, pedagogical constructs such as scaffolding (Berk & Winsler, 1995), guided participation (Rogoff, 1990) and co-construction (Valsiner, 1993), all encourage an active role in the teaching process. The concept of "teaching through play" has been discussed as a way for teachers to articulate their pedagogy (Bennett, Wood & Rogers, 1997; Hedges, 2000). Further, a sociocultural perspective views children as active agents and participants in determining what constitutes curriculum and appropriate pedagogical approaches.

The data gathered in the present study illustrated a range of pedagogical strategies from a sociocultural perspective. All three teachers in the study frequently scaffolded children's learning. For example, Shaina and Kate were both observed assisting children to learn screen-printing procedures. Child peers also scaffolded each others' ability to acquire skills such as making fans and yo-yos. As a pedagogical technique, scaffolding describes the process of providing temporary guidance and support to children as they increase competence in learning (Berk & Winsler, 1995). The more knowledgeable partner needs to determine when the learner is ready to move from one level of competence to another by a process of careful, sustained observation and interaction.

Rogoff (1990) developed the concept of scaffolding further in her construct of guided participation. Guided participation provides more focus on the role of children as active agents and communicators in their own learning and development than scaffolding. An example in this study, which places a child in the role of the expert with prior authentic knowledge, was Penguin 2 setting up tables, paper, pens and a computer to be an Accident Compensation Corporation (ACC) office. She initially took a lead role with three other children in explaining what ACC was about and the importance of filling in forms correctly in order to receive benefits. By the end of the incident, she had guided the other children through explanations and clarification several times, and then left the other three children to pursue the game while she went elsewhere with a doll in a pram. Rogoff sees guided participation as a gradual release of responsibility to the learner. Guided

participation also implies more than the explicit act of breaking something down into component parts for learners to progress through. The more skilled and knowledgeable partners often gain understanding of the teaching process they facilitate for the learner too. This has also been demonstrated in the present study, for example, as parents reflected on the success of their attempts to teach their children writing skills and when the teachers discussed pedagogical content knowledge in relation to children's understanding.

Co-construction is described as shared meaning-making which acknowledges cultural and social forces (Valsiner, 1993). In this construct, learning occurs through children's complex and dynamic efforts and actions to build knowledge of the world, and the social and cultural processes involved in everyday activities with people. These two aspects are both dependent on each other and also part of each other, hence the term co-construction. Many examples of co-construction were evident in the data related to the excursion as children shared and negotiated meaning with teachers, parents and peers (e.g., Frankenstein and whale sharks; Orca and Penguin 2's knowledge of penguins). All three teachers were observed co-constructing shared meaning with children. The examples earlier of Kate and the children with the dead bird and Mary and the children classifying a toy dinosaur illustrate co-construction.

Co-construction combines two views of learning: learning as a process of constructing knowledge and exercising skills or dispositions, and learning as a participatory process of collaborative interpretation and meaning-making. This approach encourages both adults and children to have an active role in the teaching and learning process, and emphasises that intersubjectivity is critical in teachers and children learning together. This construct appears to have potential in describing the processes of the "transformation of participation" that Rogoff et al. (1996) regard as central to a community of learners, as it recognises the complexities of the teaching and learning relationship. Moreover, this approach acknowledges children's prior knowledge and expertise as being a valid and worthwhile contribution to the learning process.

In relation to peer interactions, Verba (1994) claims that "the relative equality of partners with respect to competence and social power in peer interaction allows processes of co-construction to emerge that differ from those characterising adult-child interaction" (p. 126). There may be more equality in the efforts of partners to develop shared meaning if a

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power imbalance is not perceived. An example in this study was the group of children negotiating the requirements involved in completing Accident Compensation Corporation forms when Penguin 2 had left the game. Although one had constructed a more accurate knowledge of this process, the others contributed equally to the evolving game and its conceptual understandings. A further example was children's attempts to clarify their understanding of what Shark could mean by a "hammerhead dolphin", described earlier.

Constraints on maximising children's learning

There are likely to be a number of constraints on maximising children's learning in early childhood education. The present study highlights two of these: teachers' confidence in their subject knowledge and group size.

Teachers' subject knowledge confidence

In the present study, teachers and parents stated that it was unlikely that adults could have sufficient broad knowledge to engage in spontaneous teaching during all unreturning moments. One teacher, Kate, stated a belief that teachers should have a good broad general knowledge and an ability to model to children how to access information on specialist topics. Where teachers did not have answers to questions that occurred during spontaneous teaching, they accessed information from cultural tools such as books or the Internet with the child. Some parents reported undertaking a similar strategy. Kate's approach supports a community of inquirers notion (Wells, 2001a), in valuing the learning undertaken collaboratively between adults, adults and children and children as peers, that co-constructs new knowledge and thinking for the participants. In both a community of learners and a community of inquiry, learning is valued as ongoing for all participating in it. In relation to Kate and Shaina's knowledge of the scientific explanation for popcorn popping (p. 92), their willingness to learn and increase appropriate knowledge is what Cullen (1999) claims is essential for teachers to extend children's knowledge. It is also consistent with the notion of a community of practice as the learning was shared and passed on among the community members.

Supporting children's knowledge in child-initiated and spontaneous learning and teaching, and children's understanding of the excursion experience, required teachers to draw on and access subject knowledge. Anning and Edwards (1999) identified that teachers who are confident in subject knowledge are more likely to recognise and maximise potential

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learning in children's play experiences. The teachers in this study were unsure of their confidence across subjects.

> *Kate - I feel more confident in different areas than other areas. I feel confident in art. I feel pretty confident in science. ... in physical development ... in literacy and numeracy.*
>
> *Researcher - And what about you Mary?*
>
> *Mary - No, I have to be honest and say I wouldn't probably feel confident in any areas. (Except) probably ... self-esteem.*
>
> *Shaina - I'm confident at doing music. Because I've done a lot. I was brought up with a music background, and then I've danced since I can't remember. Whereas science I'm probably not as confident.*

Beyond merely confidence, teachers may need to demonstrate a certain level of knowledge so that children's learning is accurate. In relation to science, Parker and Heywood (2000) raise concern that "(junior primary) teachers may often lack a personal scientific background on which to draw and that indeed, many may themselves hold misconceptions of current scientific ideas" (p. 90). This was the case with regard to the popcorn. An example of Shaina's lack of confidence with science was illustrated by her decision not to go ahead with a small group experience because of a lack of confidence in her subject knowledge; an inability to explain the concepts of sinking and floating to children (see appendix 10).

To maximise children's learning, teachers need to have subject knowledge in order to lead children towards accurate conceptual understandings through investigations. Haynes (2000) declares that early childhood teachers need an abundance of subject knowledge to teach confidently within the holistic, integrated, play-focused learning in early childhood contexts. In this regard, Willer (1994) asserts that teachers need to know "about everything - science, social studies, literature, math, music, and everything else in their (children's) world of experience" (p. 14).

Group size

One of the main difficulties in extending children's learning through active teaching including subject knowledge in this kindergarten was the number of children in the group. The teachers frequently commented on group size as a constraint (see pp. 96-98).

In the parents' second interview, when the researcher asked about parents' impressions of her presence at the kindergarten, the following exchange occurred.

Sue - You've had a big impact on Penguin 1. It's not to do with the trip. But with daffodils.

Lucy - You've certainly made an impact as a person, I guess I hadn't been looking at the trip.

Cara - And Frankenstein loved to do the drawings and writing and things for (name of researcher).

Sue - Your name definitely does come up a lot at home. She's just absolutely loved the time with you.

The same question of the teachers provoked the following responses:

Kate - I think it has been great to have the extra language that was happening and the interactions have been wonderful. And probably a bit more in-depth than what we can sometimes, because of our ratios, which has been really good.

Mary - The children would have benefited lots from it.

The presence of the researcher as a fourth "teacher" in the setting was therefore acknowledged as potentially improving the opportunity for quality teaching and learning for all children and all teachers. These comments illustrate that group size was a constraint on teachers' ability to maximise children's learning. Research on group size supports that smaller groups provide greater opportunities for children's learning (Farquhar, 1993).

Teacher-parent partnerships

Teachers expressed strong beliefs in their philosophy of partnership with parents and families/whānau, a key feature of this kindergarten community of practice, and early childhood education more widely (Blenkin & Kelly, 1997; Ministry of Education, 1996, 1998). Kate stated that:

I see it very much as a partnership between the children and us and the parents. ... I think it is something that we all work together at.

Mary described working with families as a reason for choosing kindergarten teaching.

I like the family involvement in public kindergarten, I really like it, and for me that is a really good part of the job.

The excursion was seen by Kate as an opportunity to work in partnership.

It's an extension of our curriculum, of what we are doing. It's a way of reinforcing
learning. It's also a way of involving parents in their child's learning, which is
really important.

Parents also discussed how teachers support and complement the home environment. Rose
gave an example of teachers supporting children's learning of socialisation skills.

But when he comes here, the same things are taught by teachers, ... When I say
something like "don't push other kids" and I say I told you that, ... but when the
teacher told him, (he listened).

Carr (2001a) notes that as a child develops a sense of identity as a learner, multiple
voices, including the child's voice, and connections between the home and centre,
should be included in teaching and learning practices. In this study, teachers were
aware of some parents' involvement in children's interests and knowledge, for example,
Kitten's knowledge of cars and Orca's of sea creatures. Teachers noted that the
research probably made parents more focused on the learning related to the excursion.
Portfolios provided the potential for links between home and kindergarten learning to be
recorded and utilised in planning curriculum.

Consideration of the following findings may further enhance this partnership within this
community of practice. Related to group size, differences in perceptions of the parent-help
role occurred between parents and teachers. These differences demonstrated a lack of
shared understanding that impacted on meaning and identity within this community of
practice. Parents' comments indicated that domestic duties such as food preparation and
tidying-up dominated the parent-help role due to the number of children. For example,
Eve said:

I had no time playing with Bunny. I didn't have time, just too busy cutting up fruit
and cleaning up the mess.

However, the teachers' beliefs about parent-helping indicated they were unaware of
parents' perceptions that the domestic tasks overshadowed other possibilities.

Shaina - We don't tend to bombard them with a whole lot of jobs that they do. They
actually have a chance to look around, and they actually see what ... happens and
what their child is doing at kindergarten.

Fieldnotes supported that parents undertaking the parent-help role largely spent their time on domestic tasks. For some, this may have been a way to avoid deeper involvement in the programme. Others sometimes interacted with children in ways contrary to the teachers' philosophy, for example, drawing outlines for children to paint. However, if parents were assisted to develop their knowledge and skills, they may add to the quality of interactions teachers considered appropriate, and therefore reduce some of the concern associated with group size. An incident recorded in the fieldnotes illustrated this point.

> *Anne offers to stay to parent help today as Kate had put a message on the*
> *(kindergarten) notice board asking if anyone could stay. At one stage, Anne stands*
> *behind and talks to the group of children investigating the arrival of clay with*
> *Kate. She asks open questions. However, perhaps as she is not seated with them,*
> *or perhaps because they don't know her so well or aren't used to parents being*
> *involved in the play, the children do not respond to her. Later in the morning a*
> *child asks me to fill up the food tray for morning tea. Anne says, "I'll do it."*
> *Towards the end of the session, Mary asks Anne to fold the Kelly Tarlton's*
> *newsletters and put them in the pockets for parents to collect at the end of session.*
> *Anne immediately agrees to do so. (Has she retreated to the safety of the domestic*
> *tasks?)*

All three teachers in this study stated that parent partnership was important to them. Although respecting the teachers' beliefs that more parent help in itself will not increase the number of quality interactions in the kindergarten, this study indicated that the potential of parents was perhaps not being accessed, as the incident with Anne illustrated. While acknowledging that the sessional nature of kindergartens often means high parent turnover rates, parents' interests, skills and resources were an untapped potential contribution to this kindergarten.

Teachers' knowledge base re-thought

Contemporary approaches to learning and teaching described in notions of learning communities present a challenge to the early years field to articulate new pedagogy and educational practices. Such approaches acknowledge an active and visible role for a teacher in the learning process. In turn, a repositioning of the knowledge base of early years teachers is required (Cullen, 1999; Dahlberg et al., 1999; Dockett & Fleer, 1999; Rodger, 1995).

Teachers' professional knowledge

Beliefs expressed by parents and teachers were evidence for the argument that the developmental discourse remains dominant in early childhood education. Knowledge of child development was seen as the basis of teacher knowledge in kindergarten by parents.

> *Lucy - They've got a very good picture in their mind of normal development too, so they know where they're going, ...*

Teachers also emphasised child development, alongside philosophy, as underpinning teachers' professional knowledge.

> *Kate - We have that core understanding of child development and what we believe in our philosophy.*

Parents' and teachers' beliefs about what children should learn at kindergarten also supported this discourse. Parents focused on social skills and interacting with other children, and emphasised developing independence. Among the teachers, Shaina also first mentioned social skills and Mary emphasised self-esteem as a primary goal.

Child development knowledge has the potential to give teachers the ability to describe and interpret observations of children and families and use good judgement in their interactions. It also informs areas such as early literacy, for example, the physiological preconditions required. Developmental perspectives therefore remain one important theoretical base for informing curriculum and teaching practice (Stott & Bowman, 1996; Woodhead & Faulkner, 2000). However, child development knowledge has perhaps been imbued with a status that has been reified within the early childhood community of practice.

In this instance, in order to promote children's conceptual learning, teachers need additional knowledge, such as subject knowledge, to complement developmental psychology. Mary noted that she had undertaken subject learning during teacher education, but that:

> *I think a lot of things that we did, was just like a smatter. ... But, for specific subjects, ... maths ... . (For) that type of knowledge, I think I've probably felt a little bit unprepared.*

Moreover, much pre-service knowledge can seem quite irrelevant unless it has been learned when student teachers can appreciate and understand the link between the concepts or theories and the reality of teaching practice.

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> *Mary - I had one semester of art in my very first year. It had no relevance to me at all. I hadn't even been on a practicum.*

Haynes (2000) noted that the writers of *Te Whāriki* raised concerns about the introduction of subject learning in an early childhood teacher education programme. Carr and May (1996) argued that focusing on subjects could inhibit a holistic approach for pre-service early childhood teachers and prevent some of the weaving of experience and meaning implicit in the model of learning represented by *Te Whāriki*. In contrast to this view, Haynes' research indicates that student teachers found a subject approach useful in their teaching practice. Yet Mary's comments indicate that the breadth and depth of subject knowledge required, and when this is best placed in a teacher education programme, ought to be further researched.

Other forms of professional knowledge may also need to be researched and re-thought for early childhood teachers. The focus of this thesis was the category of professional knowledge of pedagogy and curriculum that Carr and Kemmis (1983) delineated as one of seven categories of teacher knowledge. The relevance of the other categories in teachers' knowledge are also evident in the present study's findings: educational theory; contextual knowledge of individual students, the class, community and culture; skill knowledge of effective teaching strategies; social and moral theories and philosophies; common-sense knowledge and the folk wisdom of teachers. Moreover, Carr and Kemmis' categories acknowledge the contribution of contextual and cultural knowledge highlighted in sociocultural theory.

Teacher beliefs

One teacher's comment supports the evidence that teachers bring enduring beliefs to teaching (Richardson, 1996; Raths, 2001).

> *Mary - I think that would be a huge thing for me, is my own values and beliefs. At (teachers') college, what I've learnt obviously that's impacted on me. But I think for me, a lot of it I already felt anyway. That just sort of reinforced what I already believed.*

Kagan (1992a) suggests that pre-service teachers exit teacher education programmes with the same beliefs they brought to them. Moreover, new knowledge is only put into practice when consistent with beliefs.

Teachers, in response to specific children and educational settings, form theories of practice. These are beliefs about the learning environment provided and the curriculum and pedagogical practices teachers engage in. They may not necessarily be clearly articulated and will be influenced by prior beliefs as well as theoretical and practical knowledge. In their teaching practice, teachers develop therefore what has been referred to as "implicit theories" (Spodek, 1988). As teachers gain further experience and knowledge, they review their theories. Participating in this study enabled these teachers to explore beliefs and their implicit theories.

> *Mary - I find the professional development I do now much more relevant than what I did at college, because I can actually relate it to something.*

Sustained and supported professional inquiry may further these teachers' synthesis, review and reflection on theory, beliefs, philosophy and practice.

When questioned about where they felt their subject knowledge came from, Kate said from life and education. Mary noted that she had undertaken subject learning during teacher education, but felt it was insufficient and left her feeling unprepared. All three teachers agreed that teacher education was only the beginning of learning to teach and the knowledge required, and that ongoing learning was important. These beliefs further support the notion of the three teachers in this team forming a community of practice. The teachers in this study commented on the value of their participation in this research as professional development. Articulating beliefs enhanced team philosophy and understanding. Reviewing and discussing findings encouraged reflection on practice and consideration of alternative approaches to curriculum and pedagogy that might highlight subject knowledge. These ideas are suggestive of the four components of a community of practice: community - learning as belonging, identity - learning as becoming, meaning - learning as experience, and practice - learning as doing (Wenger, 1998).

The present study highlights that addressing teacher beliefs and providing some subject knowledge are important current issues for early childhood teacher education. Targeted professional development may also be a key strategy to develop teachers' ability to construct learning with children that stresses subject knowledge learning within a sociocultural approach to curriculum and pedagogy. Moreover, Haynes' (2000) finding that student teachers consider the curricula across the early years (*Te Whāriki* and the *New*

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Zealand Curriculum Framework) complementary, and moves towards early years degrees qualifying teachers in both early childhood and primary sectors, suggest that considering progression and continuity between the settings for children related to curriculum and pedagogy warrants attention.

Early years contexts: Continuity and progression

Teachers and parents in this study spontaneously raised the transition between early childhood education and junior primary school as an issue. One parent, Cara, said:

> *I don't think it should be too different. I think ... the person (teacher) should be very similar, because the child's not that different from kindergarten to primary.*

One teacher supported this view:

> *Kate - I feel there shouldn't be a difference between early childhood and primary teachers.*

Another teacher suggested:

> *Mary - The first year, year one, ... what I would like to see, is like, in a classroom, an early childhood teacher and a primary school teacher working together. ... because it just makes that transition smoother. ... because I think that year one could be, like early childhood is.*

Children experienced great excitement and anticipation with regard to turning five and going to school. The social identity of "being nearly five" (Carr, 2001b), about to join a new learning community, provided a strong learning orientation in this kindergarten, congruent with Carr's findings. Penguin 1 and Starfish demonstrated this. Penguin 1 brought in her newly-purchased school uniform twice to proudly show her peers and the teachers: "*Mummy said I can put it on but I have to change again afterwards.*"

> *When I first see Starfish today, she calls out to me "I went on my first school visit yesterday. I learned to read." She has brought the poem she learned. She gets it out of her bag to read to me. I ask her to point to the words as she reads them. She accurately points to the lines but not the exact words as she says them. (fieldnotes)*

Pedagogy

In the present study, parents' perceptions were that school preparation should be provided overtly. Lucy commented:

I think maybe they could have a 4 ½ year old group, or a getting ready for school group.

The current small group teaching times provided ample opportunities for children to develop the kinds of skills parents suggested. Few parents took the opportunity to observe small group teaching occur and possibly lacked awareness of what was actually provided. Comments made by parents, for example, an idea for an early literacy experience that was already in practice in the kindergarten, suggested that parents may not have a full picture of what occurred at the kindergarten.

Parents and teachers' discussions of children's subject knowledge focused on literacy during the present study. Teachers described how preparation occurred appropriately as part of the normal programme. Including a range of purposeful socially and culturally relevant literacy events and providing access to a range of media provides children with early literacy skills and knowledge in ways consistent with sociocultural theory. These experiences were provided in this kindergarten through following children's spontaneous interests and following up on planned experiences such as the excursion. Examples from this kindergarten included writing lists of questions children wanted answers to from the excursion, drawing pictures of sea creatures and dictating or writing sentences about the excursion experience underneath, listening to and talking about stories, writing lists of shopping items, and recognising names and symbols.

The importance of a wide range of first-hand experiences to give context and relevance to learning has been highlighted by research into literacy (David et al., 2000). This has important implications for promoting experience-based learning in early childhood education where children actively construct culturally-valued knowledge such as literacy within authentic social and cultural interactions and contexts. Although present in this kindergarten, literacy and numeracy experiences and learning outcomes were underemphasised in curriculum documentation and underrecognised by parents. While provision of appropriate experiences was evident to the researcher, these were not communicated explicitly to parents.

Similarly, numerous experiences consistent with sociocultural approaches were provided within the kindergarten that gave children opportunities to construct mathematical ideas. As noted, an example that occurred in relation to the excursion was that Frankenstein,

Shark and Orca wondered if they would see a whale shark at Kelly Tarlton's. Kate assisted them to find out the dimensions of a whale shark, measure this out using string and form their own conclusion that it was unlikely one would be present.

Concern that parents' beliefs may exert pressure on teachers to provide a special academic preparation programme has been previously raised (Cherrington, 2001; Sharp & Davis, 1997; Stipek et al., 1992). Hoot, Parmar, Hujula-Huttunen, Cao and Chacon (1996) note the supposition that early childhood approaches to teaching should change to prepare for schooling demands. In their study, parents expressed that they wanted children to learn, not play, when they got to school. Parents gave support for didactic teaching approaches, use of work books and regular formal assessment in programmes for three-to-five year olds. Research so far has not demonstrated long-term gains from such approaches (Marcon, 1999, 2002). Marcon (1999) found that what appeared to be academic advantages upon school entry as a result of formal programmes were soon washed out by school experience. In her follow-up study, Marcon (2002) found that children who had experienced academic preschool curricula gained lower grades in their sixth year of schooling compared with children who had attended play-based, child-initiated early childhood experiences.

A sociocultural perspective suggests that given the differing beliefs of the teachers and parents about the literacy and numeracy experiences occurring within this community of practice, the opportunity to share and re-visit assumptions, alongside evidence of children's learning, would be beneficial to all participants, including the children. At an organisational level, the effectiveness of the community might be increased (Wenger, 1998).

Curriculum

Beliefs about the difference in curricula approaches adopted in the two contexts were however shared between teachers and parents. One parent, Lucy, stated:

> *I think the curriculum at a kindergarten is much more open, and ... children explore in their own way. Whereas a primary school teacher, I mean she's got to teach them to read, and she's got to teach them to write.*

Teachers' beliefs concurred.

> *Kate - I think their curriculum is much more prescribed than ours.*

Shaina - So they are looking at certain topics and information about it. But it is not necessarily coming from the children.

Perceptions that there were few differences between the knowledge base required by early childhood and junior primary teachers were expressed by parents. However, teachers felt the different emphases of the curriculum and pedagogy impacted on the knowledge required.

Kate - I think that they (primary teachers) have to gain knowledge in specific areas. But that knowledge will see them through. ... Perhaps ours is a broader knowledge base that we need to have in some instances, as we are catering for the children's individual interests.

Teachers expressed uncertainty about connections between early childhood and junior primary curricula. Mary was the only teacher who had studied the *New Zealand Curriculum Framework* during her teacher education.

I mean I know there's links, I don't know if I actually specifically do it. I probably should, (be)cause they told us to at college. ... If a parent asked me, I could actually show them if I had the documents in front of me.

Kate seemed unsure of the curricula documents, with her view for example of the "first stages" appearing to reflect developmental skills.

... having looked at the NZ curriculum documents, I mean it is very similar, ..., we just do the first stages, which are going to be extended on when they get to school. So there is definite links ... between the two.

Researcher - So what's the first stages?

Kate - All the pre-literacy type things that we are doing here. So ensuring that children (are) crossing their mid-line and the physical skills and all that ....

Later Kate told the researcher that she had exchanged curricula documents with her local primary school a few years ago. She reflected that although she had familiarity with the curriculum, she felt unable to articulate content links and was more comfortable with explaining developmental factors.

Shaina demonstrated some awareness, but not depth of understanding, of the connections made between the curricula in part four of *Te Whāriki*.

It's at the back ... I know it's there, and I do actually use it when I write up some of the things that children learn. ... So I do use that back bit quite a bit. There's literacy, isn't there? Numeracy and all that at the back, isn't there? I can't remember all seven of them.

In summary, parents and teachers raised concerns about the sudden changes in curriculum and pedagogy children experience as they move from kindergarten to junior primary school. Documenting children's subject content learning more explicitly in early childhood education may reduce this apparent abruptness. Assisting parents' understanding of ways in which early childhood curriculum and pedagogy lay foundations for school learning, consistent with sociocultural theory that views culturally-valued learning as occurring in authentic contexts, may reduce concerns about providing preparatory programmes for children.

In addition there is also a need for early childhood and primary teachers to create a community of practice to strengthen links and smooth children's transition between settings. This has been one aim of a professional development programme focusing on literacy (Phillips, McNaughton & McDonald, 2001). Improving teachers' understanding in both settings of *Te Whāriki* and the *New Zealand Curriculum Framework* may assist teachers to articulate and practise links between the two early years sectors. Adopting the "and", rather than the "either/or" approach of a community of learners may perhaps soften the seemingly polarised nature of the two contexts of early years education.

Summary

Sociocultural approaches to curriculum and pedagogy in early childhood education, taking prior knowledge into account and emanating from children's interests and inquiries, emphasise the importance of intersubjective relationships and interactions within the community of learning in which children engage. This chapter provides evidence of the socially-constructed nature of learning within one kindergarten community. The social construction of knowledge occurred not just between adults and children, but also between children and between adults. Most participants in this study, including the researcher, learned through inquiry and exploration of ideas. This lends credence to the sociocultural notion of learning communities.

Concepts such as a community of learners (Rogoff et al., 1996), a community of practice that emphasises identity and conceptualises learning as situated apprenticeship (Wenger, 1998), and a community of inquiry that co-constructs learning (Wells, 2001a, 2001b) have enriched explanation of the study's findings with regard to subject knowledge. Pedagogical strategies for maximising children's learning and current constraints on these have been identified. A closer relationship between the learning communities in the early childhood and junior primary contexts is suggested to enhance continuity and progression between them for children.

Chapter Six
DISCUSSION AND CONCLUSIONS

"Discipline-based (subject) knowledge provides children ways of learning about the world; describing what is learned; structuring knowledge; testing assumptions and challenging understandings; and defining and solving problems" (Bredekamp & Rosegrant, 1992, p. 69). The final chapter argues that subject knowledge is currently a missing paradigm in early childhood education. It considers the implications of this argument in relation to curriculum, practice, policy, and teacher education and professional development. Sociocultural notions of learning communities are suggested as having potential for inquiry and reflection on beliefs and practices with regard to subject knowledge in the early childhood and teacher education communities.

Knowledge in a sociocultural curriculum

Identifying what knowledge is of most worth was stated earlier as a fundamental epistemological task. *Te Whāriki* proposes that teachers base curriculum on children's interests. While children's interests can provide an initial stimulus for planning, interests do not emerge in a vacuum, but from children's participation in social and cultural experiences. Curriculum ought to also include culturally-valued knowledge. Further, socially-constructed learning involves not just knowledge per se, but use of that knowledge to develop as a person and member of society.

> And where was it all recorded? … for the children? We hope it was recorded in their hearts and souls, in their memory and imagination, to be recalled later in their lives and transformed into a creative impulse, in scientific exploration, in the ability to think broadly and widely and to carry a moral impulse to help mankind and for the future of the earth. These are OUR desirable outcomes for the children who passed through our kindergarten (Drummond, 1999, p. 57).

Te Whāriki's overall goal for children is "to grow up as competent and confident learners and communicators, healthy in mind, body, and spirit, secure in their sense of belonging and in the knowledge that they make a valued contribution to society" (p. 9). From this perspective, according to Wells (2001a), the principal purpose of education becomes that all involved, that is, teachers and learners, "transform their capacities to act, think and feel in ways that contribute to the common good and enrich their own lives" (p.1).

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There may be some commonalities in goals for children in different social and cultural contexts. It is likely that the knowledge required to function as an adult in a society is one of these. But the nature of that knowledge will differ because of the characteristics of different contexts and communities. The present study does not suggest that communities, individually or collectively, can or should necessarily share goals, beliefs or practices. Collaborative inquiry does not assume shared goals or beliefs, but involves a willingness to discuss beliefs that may differ, to form mutual understanding and partnerships between community participants. Moreover, disagreement may promote useful challenges to established practices. Understanding each others' views within and across learning communities may lead to the enhancement of children's education.

If functioning as an adult member of society requires a body of knowledge, what should that knowledge consist of? Subject content knowledge has been established as culturally-valued knowledge in western society, leading to social and economic contribution and advantage (Bempechat & Drago-Severson, 1999). Gardner's (1983) work on multiple intelligences and Wenger's (1998) concept of communities of practice could be argued as supporting a broad curriculum that represents culturally-valued kinds of knowledge. "Knowledge is a matter of competence with respect to valued enterprises - such as singing in tune, discovering scientific facts, fixing machines, writing poetry, being convivial, …" (Wenger, 1998, p. 4). The outcome is constructing an identity and sense of belonging in relation to the values and goals of the communities. Certainly, a broad knowledge is commonly promoted in a curriculum, including literacy, numeracy, science, health, geography, arts and music (Edwards & Knight, 1994). Moreover, if a sociocultural curriculum involves culturally-valued knowledge, following Dewey's (1938) progressive ideology, curriculum becomes an entity that is constantly evolving and being negotiated between teachers and learners. This again supports the claim that teachers need a broad general knowledge base to support children's learning (Cullen, 1999; Haynes, 2000; Kallery & Psillos, 2001; Willer, 1994).

Children had a wide range of interests and knowledge in this study. Children expected that teachers and parents would have knowledge to support and extend these interests. This expectation further supports the contention that teachers (and parents) need both general and specialised subject knowledge, and access to cultural tools to increase knowledge. "A sociocultural approach focuses on how children's communities, their activities, and

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relationships with members of their communities collectively guide children's development and education" (Göncü and Katsarou, 2000, p. 221). In relation to literacy, Göncü and Katsarou propose that understanding children's learning needs to be related to the goals for education established by the communities and cultures in which the children are educated. They argue that children benefit from teaching which is embedded in experiences such as play that are meaningful to children. These recommendations also require teachers to be aware of and work with children's prior knowledge.

Children gain opportunities for constructing knowledge in socially-constructed experiences in learning communities. The community of learners and inquiry models acknowledge the sociocultural origins of knowledge and also allow for the flexible and changing agency of participants within the learning and teaching processes. These models are suggested as being consistent with the sociocultural view of children as capable and competent, and stress both the central role of dialogic inquiry and the intersubjective nature of the reciprocal and responsive relationships highlighted in early childhood pedagogy.

Subject knowledge: A missing paradigm in early childhood education
Currently, it appears that subject knowledge may be part of the hidden (i.e., underemphasised), or null (i.e., consciously excluded), curriculum (Carpenter, 2001) offered in early childhood education. It may also be a missing paradigm (Shulman, 1986) in early childhood teachers' professional knowledge. In 1989, Drummond suggested that concepts of child-centred learning based on developmental domains and the play-based learning opportunities commonly offered in early years programmes concealed "a conceptual vacuum at the centre of our work" (p. 6). This conceptual vacuum may indeed include subject knowledge.

Recent calls in New Zealand to develop a "knowledge economy" alongside predominant "new right" policies and philosophies could however be misinterpreted in the early childhood sector (May, 2001). Calls for early academic learning to give economic advantage and calls for an outcomes-based model of learning and assessment are all risks of adopting an overt approach to subjects. Marcon's (2002) research suggests such an approach is flawed. The emphasis on subject knowledge recommended by the present study is designed to enhance the play-based, integrated philosophy of early childhood education and to respond meaningfully to children's content-related inquiries.

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It is not pretentious to talk about teaching young children subjects if this is done in a way consistent with views expressed by Bruner (1960) and Dewey (1902, 1938). The age of the learner is not as important as utilising discipline-related subject knowledge in the curriculum in a way that is appropriate and relevant to children's interests and funds of knowledge. In this study, children gained much knowledge about science and technology from the excursion experience. In the context of early science education, Inagaki (1992) recommends that teachers acknowledge young children's early domain-specific interests and knowledge as a basis for supporting their deep involvement in learning.

Willer (1994) claims that general knowledge ought to comprise the content of curriculum for children. If this were so in the present study, curriculum documentation and teachers' knowledge and interactions would reflect the importance of subject knowledge. However, subject knowledge was underemphasised in spontaneous learning and teaching interactions in this kindergarten and in programme documentation based on *Te Whāriki*.

Teachers believed subject knowledge was important, but they lacked some confidence in the personal knowledge base they drew upon in their interactions with children. A lack of confidence may have been one reason why teachers' beliefs and practices were not in accord. Teachers' awareness of the potential of subject knowledge for the curriculum grew during the research. This increased awareness provides further evidence for Ure and Raban's (2001) finding that discussion with teachers promotes reflection on knowledge and practice. Teachers and parents also realised that it is not just a matter of having subject content knowledge, but having sufficient understanding of it for the purposes of sharing and communicating this knowledge to young children; the concept of pedagogical content knowledge.

The present study argues for enhanced awareness of subject knowledge in early childhood learning, teaching and curriculum in Aotearoa/New Zealand. The findings of this study propose that within a child-initiated, integrated and play-based approach to pedagogy and curriculum, the subject knowledge of both teachers and children calls for explicit attention. This study supports Maynard's (1996) claim that such a change in emphasis is consistent with maintaining early childhood philosophy.

The findings of the present study also provide further strong evidence for the socially-constructed nature of children's learning in supportive learning communities. Acknowledging sociocultural perspectives on curriculum and pedagogy through notions of learning communities has the potential for subject knowledge to be more prominent and support children's desire for such learning. To improve children's opportunities for socially-constructed learning, educational practices and policies, and teacher education need to be reviewed, highlighting implications of the present study's findings.

Implications for curriculum and teaching practice

The teachers in the present study were focused on developmental perspectives of children's learning, consistent with what has been a dominant discourse in early childhood education. Sociocultural perspectives of learning suggest that other theoretical frameworks and models of teacher knowledge should complement child development as a basis for teaching practice. Socially-constructed learning opportunities include both planned and spontaneous experiences, with teachers sharing the learning with children. The language of subjects, that is, "science, social studies, literature, math, music, and everything else in their (children's) world of experience" (Willer, 1994, p. 14) provides a means of communicating knowledge and thinking. Suggestions made earlier for maximising socially-constructed learning were building teachers' confidence in their subject knowledge, teachers' awareness of a range of pedagogical strategies and utilising parent partnerships more effectively.

Furthermore, in relation to curriculum planning, the findings of the present study suggest that a lack of emphasis on subject content knowledge may limit learning and teaching. This supports concerns raised by Backshall (2000) that *Te Whāriki's* lack of emphasis on content knowledge may be limiting curriculum provision in early childhood education. In addition, *Te Whāriki* states that curriculum planning should be based on children's interests. Children's interests alone are insufficient for extending children's learning and providing a basis for teachers' planning (Raban, 2001). Early childhood teachers can also stimulate and encourage children's interests through the introduction of topics and information outside children's experience that contribute to the construction of knowledge, within a sociocultural curriculum that meet the goals and values of the community and society. The potential constraints of teachers' interpretation of *Te Whāriki* as a basis for curriculum documentation are recommended as an issue to be addressed.

Responding meaningfully to children's curiosity and interests is a focus of communities of learners and inquirers. Consistent with a sociocultural approach, a recommendation for curriculum planning and documentation is use of a project approach (Helm & Katz, 2001; Katz & Chard, 2000). Projects are based on children's prior knowledge, interests and questions, and are co-constructed by children and teachers for their duration. As one example, the possibilities for children's learning resulting from a project responding to the children's real and serious questions about the structural engineering of the underwater glass viewing tunnel at Kelly Tarlton's were immense.

Teachers have recently been introduced to a wider perspective of pedagogical documentation (Alcock, 2000; Dahlberg, Moss & Pence, 1999; Helm, Beneke & Steinheimer, 1998); that is, documentation that contributes to knowledge of children's learning and how this can be extended in curriculum planning. This is potentially useful in New Zealand given that ERO (2000) has recently challenged the early childhood sector to document children's learning more comprehensively. Portfolios encourage revisiting children's knowledge and interests, an essential component of the knowledge-building process. They can also be used by children to reflect on and share their learning and learning strategies (Helm & Katz, 2001) and may encourage teacher reflection (Alcock, 2000).

In the present study, the potential to document subject learning was evident in one child's portfolio where his knowledge of sea creatures was recorded. In particular, highlighting literacy and numeracy learning may alleviate the concerns of ERO (1998, 2000) and reflect parents' beliefs that content learning should be more overt in early childhood. Likewise, a wider perspective of documentation may encourage group documentation of shared experiences (Helm & Katz, 2001), such as an excursion. This further supports the perspective of learning as socially-constructed and collaborative, and both reduces and complements the emphasis on a "focus" child that tends to support the individualistic approach of developmental psychology.

A capacity for learning in ways consistent with a sociocultural approach has led to consideration of children's dispositions for learning. Dispositions such as curiosity, involvement and perseverance (Carr, 2001a) were evident in the present study. Likewise, teachers can view children as emergent learners (Cullen, 1998b) with specific learning

orientations also evident in this study, such as "being a scientist" and "being nearly five" (Carr, 2001b). Lambert and Clyde's (2000) suggestions to support a dispositions approach and Cullen's (1998b) advice to support an emergent learners approach are similar. These recommendations for teaching practice include the following: significant, long-term, positive relationships with adults; opportunities to make choices and decisions and use time constructively; motivation through genuine encouragement and high expectations; opportunities for children to collaborate with adults and peers; genuine choice of and participation in a range of learning experiences; and engagement in meaningful learning experiences. These recommendations are also consistent with a socially-constructed approach to learning of subject knowledge that maximises children's learning. They could be equally applied to junior primary classrooms.

Within junior primary classes, play can be a motivational learning tool (Dockett & Fleer, 1999) and has been demonstrated as leading to appropriate subject content learning (Bennett, Wood & Rogers, 1997). Recent research evidence further supports integrating play into junior primary classes to enrich the educational environment and enhance learning (Adams-Jones & Vickers, 2002; Lillemyr, 2001). This is as an example of a pedagogical link that has potential to improve children's learning experiences across the two sectors of the early years. There is a need for early childhood and primary teachers to create a community of practice to further strengthen links and smooth children's transition between settings.

Given that early childhood education in Aotearoa/New Zealand values partnership with parents in statements of both curriculum and desirable practices (Ministry of Education 1996, 1998), there is perhaps potential for parents to be positioned more strongly in early childhood communities. Certainly, shared, informative communication between teachers and parents is vital if children's learning is to be maximised. Teachers' ability to explain early childhood curricula and pedagogical approaches, particularly to parents, is essential (Gronlund, 2001). Moreover, in this kindergarten community, the parent help role could be developed to increase both input into the curriculum and the frequency of quality interactions occurring during the session. In part also, this may alleviate some of the concerns in the kindergarten about the large group size and high teacher-child ratios. Assisting parents to access appropriate information to assist their children's learning in a way that supports the kindergarten's approach is recommended. Waters (1996) describes a

successful evening where parents, reluctant at first, got fully involved in the kinds of messy play experiences their children learn from. According to Waters, a further advantage of increased positive participation in the kindergarten is that these parents are likely to continue their participation through to the primary school with ongoing benefit to their children.

Hoover-Dempsey, Bassler and Brissie (1992) researched parent efficacy in terms of the influence parents believe they can have on children's school outcomes. Results indicated that those with higher efficacy also had a higher involvement in parent help in the classroom and involvement in school related activities. Applied to a kindergarten setting, when parents are encouraged to participate meaningfully in children's learning there may be an increase in their self-efficacy beliefs in relation to influencing their children's learning. Such development of parents' knowledge and skill might also have flow-on benefits to parent-child interactions at home.

Organisational systems such as routines and teacher responsibilities in early childhood centres also ought to accommodate the need for concentrated, uninterrupted interactions and discussion that facilitate deep learning, whether with teachers or peers. Subject content knowledge can be increased if sustained interaction occurs alongside a knowledgeable adult or peer. Finding ways to increase the quantity and quality of teaching and learning interactions is recommended.

Implications for policy

Group size in both the early childhood and junior primary sectors of the early years may currently present the greatest constraint in teachers' ability to extend children's knowledge. High quality pedagogical interactions can only occur when ratios and group size support opportunities for sustained interactions between teachers and children. Opportunities for interactions to promote subject content learning and metacognitive strategies are crucial. The qualifications, commitment and diligence of the teachers in this study were notable. However, the group size and ratios limited their opportunities to provide frequent uninterrupted one-to-one or small group interactions and were a negative constraint on the quality of the curriculum offered. The concerns raised by these teachers are consistent with similar concerns raised by Renwick and McCauley (1995).

The present system and constraints of bulk funding means that kindergarten associations cannot currently employ any further teachers in each kindergarten. The draft strategic plan for early childhood education (Ministry of Education, 2001) recommended a maximum group size of 40 and maximum ratio of 1:13. The recently released Strategic Plan (Ministry of Education, 2002) states that group sizes and ratios are to be addressed gradually over the next ten years without specifying or committing to actual numbers. Consideration of alternative methods of funding are recommended to policymakers to enable kindergartens to reduce group size, or employ more teachers. This will enable kindergarten teachers to teach more effectively during extended interactions with small groups of children.

Moreover, outside the kindergarten service, the early childhood sector has historically been an "open entry" profession, employing unqualified or partially qualified practitioners. There is currently a mismatch between the expectations of stakeholders such as ERO and parents, and the capabilities of many staff employed in early childhood centres. The necessity for children to be taught by qualified, knowledgeable professionals for their learning to be maximised is evident in this study, and supports present policy moves to increase the number of qualified teachers in the sector (Ministry of Education, 2002).

Implications for teacher education

For teachers to effectively extend children's knowledge and thinking, developmental psychology needs to be supplemented by other theoretical frameworks, such as models of teacher knowledge. A change in emphasis to include grounding in educational theory and research, and the building of teachers' subject content knowledge is therefore recommended in both teacher education and professional development (Meade, 2000; Pramling, 1996; Wood & Bennett, 1999).

In particular, this study provides evidence that subject content knowledge is a vital component of early childhood teachers' knowledge if children's conceptual learning is to be extended in response to their thirst for knowledge. Within the range of descriptions in the international literature of what should be included in teacher education programmes, there is growing recognition of the importance of subject content knowledge. Spodek (1994) and The Association for Childhood Education International (1997) outline as one of five main teacher preparation requirements, general education, including proficiency in a

range of subject content areas similar to the *New Zealand Curriculum Framework*. Hevey and Curtis (1996) and Hyson (2002) also acknowledge subject content knowledge as part of the teaching and learning knowledge of effective teachers.

Teacher education programmes commonly include knowledge of philosophy, child development, teaching and learning, and curriculum alongside professional practice. Supporting calls for greater emphasis on subject knowledge, is that where the teachers' subject knowledge is deeper, the teacher is more likely to be confident about integrating curriculum and be aware of their own subject knowledge gaps (Grossman, 1990). What may also be crucial is that student teachers become aware of how children's knowledge is constructed in social interaction with others, become self-critical about gaps in their knowledge, and be prepared to address subject content knowledge as a form of professional development. A balance in the teacher education programme between providing what is seen as critical knowledge for beginning teachers, developing a commitment to ongoing learning and reflection on practice, and providing knowledge that relates to student teachers' practical experiences is crucial to making teacher education useful and relevant.

Child development knowledge remains one important aspect of teacher education. However, acknowledging sociocultural theory suggests a more complex, culturally-sensitive and contextualised approach to the teaching of child development is appropriate (Woodhead, 2000). Dockett (2002) recommends a problem-solving approach to child development teaching be used. This involves theorising practices from multiple perspectives and alternatives, and includes identifying the value base of each alternative. Dockett's idea supports a community of inquirers approach to teaching child development.

A further challenge for teacher educators is to address the beliefs, notions and misconceptions that student teachers may already have about teaching and learning (Richardson, 1996; von Wright, 1997) and to deconstruct and reconstruct personal beliefs that impact on their teaching (Gibbs, 1999; Pajares, 1992; Raths, 2001). If teacher education is to promote growth and conceptual change, student teachers need to make their implicit beliefs explicit, have the adequacy of these confronted and be provided with opportunities to consider and integrate new knowledge.

Davies and Savell (2000) investigated student teachers' beliefs and attitudes towards subjects during teacher preparation. Davies and Savell examined the attitudes to mathematics held by students enrolled in an early years programme. Students wrote similes to enable the lecturers to gain an understanding of their attitudes. This device gave the lecturers insight into their students' knowledge and beliefs as a base from which to encourage positive attitudes as they developed their own learning community. Davies and Savell also identified evidence that the longer a student had studied mathematics at secondary school the more likely they were to have a positive attitude towards mathematics, linking knowledge and beliefs.

The present study recommends that teacher education programmes engage with and challenge student teachers' existing beliefs to better prepare teachers for their role. Adopting a community of learners and inquirers approach based on action research models (Wells, 2002) is recommended. Such an approach could encourage student teachers to see that learning about teaching is an ongoing process that they can actively engage in and contribute to. Providing opportunities for teachers to share and critique their knowledge and beliefs in a supportive environment is also consistent with the philosophy of empowerment in early childhood education.

Inclusion of subject knowledge in pre-service teacher education may also assist early years teachers to provide continuity across the early childhood and junior primary sectors and make links between the two curricula. For those programmes whose graduates are qualified to teach in both sectors, this knowledge is crucial. To address the issues raised with regard to transition between early years settings, it could be argued that the move towards early years degrees that qualify graduates in both sectors will enhance shared understanding and partnership between the two sectors and alleviate these concerns. Moreover, from a sociocultural perspective, teachers have a responsibility to bridge such cultural transitions.

Implications for professional development

The present study's findings support the view that teachers need to have broad subject knowledge in order to effectively extend children's learning (Cullen, 1996, 1999; Wood & Attfield, 1996). Furthermore, teachers need both an understanding of pedagogical strategies to work with young children's knowledge and confidence with their own subject

content knowledge (Cullen, 1999), two key components of pedagogical content knowledge. Teachers need adequate disciplinary knowledge from a wide range of subjects (Kallery & Psillos, 2001; Willer, 1994). This depth needs to embody sufficient knowledge to promote children's understanding, the third component reflected in the concept of pedagogical content knowledge. For example, in relation to mathematics, Kirova and Bhargava (2002) found that the teacher they were working with

> realised that if the purpose of assessment was to enable teachers to make appropriate decisions to improve students' understanding and learning of mathematical concepts, then her own deep knowledge of these key concepts, facts, principles, and processes was essential for planning appropriate curriculum and classroom experiences (p. 6).

Kirova and Bhargava's recent study of professional development in the early childhood sector strongly supports the present study's argument that teachers' conceptual knowledge enables appropriate assessment and curriculum planning to occur, informs teaching approaches that facilitate meaningful learning for children, guides pedagogical documentation, and assists teachers' confidence and personal and professional growth.

Sustained, rather than piecemeal, in-service education on subject knowledge, learning theories, pedagogical approaches and curriculum appropriate for early childhood education is recommended, especially given the Ministry of Education's current concerns about literacy and numeracy arising from the ERO (1998, 2000) reports. Sternberg (1998) acknowledges that some subject content learning can be acquired on the job, and Hedges (2000) notes that it is important for children to see teachers as enthusiastic models of continuing learning. These viewpoints suggest that limited teacher confidence about subject knowledge in the early years can be attended to through professional development. Supported professional development for increasing subject knowledge is necessary to ensure teachers' conceptual knowledge is accurate in order to enrich children's learning experiences. For example, in relation to early childhood, Tsitouridou (1999) discussed the importance of professional development in science education to integrate science subject knowledge and pedagogical strategies for effective science teaching. Another professional development programme deemed successful in terms of increasing teachers' confidence in science, combined attention to key aspects of the present study: teachers' child-centred beliefs, subject knowledge, pedagogical knowledge and children's prior knowledge (Watters, Diezmann, Grieshaber & Davis, 2001). The approach of this particular programme could be considered for wider application in relation to other subjects.

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Kagan's (1992b) review also identified the importance of on-going professional development to challenge practice and underlying beliefs. The relationship between beliefs and practice is complex and teachers require assistance to understand this (Chafel & Reifel, 1996). Again, it is recommended that professional development programmes are well-designed and continuous rather than piecemeal. Successful professional development builds on teachers' beliefs and offers systematic long-term support in a collaborative process (Wideen, Mayer-Smith & Moon, 1998). As a teacher grows in experience, her/his belief system and practice becomes "richer and more coherent, forming a highly personalised pedagogy" (Kagan, 1992a, p. 74). Forming a professional development learning community for this purpose is consistent with a systematic, long-term collaborative approach.

A community of inquiry approach could also be used for working with teachers' beliefs to encourage identification of values and alternative perspectives. Based on her research, Bell (1990) advocated that both pre-service and in service teacher education "identify real dilemmas, explore these collectively, and return to test theory, seeking resolution in practice" (p. 113). Bell identified that this would enable teachers to theorise their practice, that is, explore their underlying beliefs and examine these more closely in relation to their practice. If these dilemmas related to subject knowledge, beliefs and practices could be identified, challenged and aligned to improve children's educational experiences.

Carr and Kemmis (1983) argue that authentic curriculum change only occurs when teachers make decisions about this themselves. The teachers in this study had recently attended professional development designed to improve the way they planned their programme. After one trial, they reverted to their previous system, asserting this better met children's needs and interests. In contrast, as a result of action research including consultation with parents, they were also trialling the small group teaching episodes over a longer period of time with more enthusiasm. Teachers need to own curriculum change through implementation in their own context (Blenkin & Kelly, 1997; Kirk & MacDonald, 2001). The knowledge and insight gained by the teachers in this study has increased their awareness of the importance of subject knowledge and encouraged further action research. The results of such research are likely to be relevant to them as teachers and transformed into practice to improve children's educational experiences in this kindergarten learning community.

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The Strategic Plan for early childhood education (Ministry of Education, 2002) includes promoting understanding of *Te Whāriki* by junior primary teachers, and understanding of the *New Zealand Curriculum Framework* by early childhood teachers. Currently, mismatch or misunderstanding between the two sectors of the early years means progression and continuity for children may not be smooth with regard to curriculum or pedagogy. This has been a focus of research in the United Kingdom (Wood & Bennett, 1999) in order to address this concern. The teachers in the present study lacked confidence in their knowledge of the *New Zealand Curriculum Framework* that children go on to experience at primary school. It is perhaps questionable in New Zealand how much attention has been paid to the section explaining the links between the two curricula in professional development programmes associated with the implementation of *Te Whāriki*. The example of the Early Childhood Primary Links via Literacy project (Phillips, McNaughton, & McDonald, 2001) that has provided professional development to early childhood and primary teachers in South Auckland is a notable exception. A significant way to provide smoother progression and continuity for children would be for both sectors to make further curricula and pedagogical links based on knowledge of both curricula documents in a shared community of practice.

Summary of study and contributions to the literature

This thesis has explored the beliefs and practices of teachers, parents and four-year-old children in one New Zealand kindergarten with regard to subject content knowledge. The study took place primarily through the mechanism of a cultural event, an excursion to Kelly Tarlton's Antarctic Encounter and Underwater World. Sociocultural perspectives of knowledge, pedagogy and curriculum, and research-based categories of teacher knowledge provided the theoretical frameworks for the study. Interpretivist methodology and a case study design were utilised.

From the analysis of interview transcripts, fieldnotes, diaries and kindergarten documentation, four key themes of teachers' professional knowledge emerged: subject content knowledge, knowledge of pedagogy and philosophy, knowledge of learners and knowledge of context. These themes were extrapolated from the existing research on models of teacher knowledge and found to have construct validity in the early childhood sector. Therefore one contribution of the present study is to position early childhood education within the mainstream discourse of models of teacher knowledge. Furthermore,

the study suggests that the construct of pedagogical content knowledge also has validity in early childhood education, and that "beliefs about subject knowledge" may be significant enough to be a category of teacher knowledge themselves, further modifying the models of teacher knowledge drawn upon.

The four themes were also valuable in explaining the complexities of beliefs about subject content. This complexity led to further analysis of the data through the lens of contemporary sociocultural theory. Concepts of communities of learners, communities of practice and communities of inquirers were applied and examined within the early childhood context. The importance of pedagogical relationships that promote knowledge construction was emphasised and is a further key finding of the present study.

The methodology of the study also served to illustrate the nature of socially-constructed learning in learning communities and fostered a way to genuinely hear children's voices. The use of focus group interviews with participants encouraged dialogue that contributed to negotiated knowledge construction and shared understandings between participants. Children's direct involvement as participants and the researcher's attention to relationship building prior to undertaking the children's interviews were established as essential to authentic data gathering techniques.

Furthermore, a community of learners approach emphasises that learning is a collaborative participation in shared experiences. The present study was a shared learning experience between the participants and the researcher. In a review of the value of educational research for teaching practice, Kennedy (1997) noted that the kind of research teachers find useful is that which informs them conceptually rather than prescribes action. Moreover, inconsistencies between teachers' beliefs and practices need to be identified so teachers can be supported to improve practice (Fang, 1996). Results of a study may therefore also impact on teachers' practice and professional development (Robinson, 1998), and improve children's educational experiences (MacNaughton, 1996). Perhaps most importantly, if validity in educational research resides in its usefulness from the perspective of teachers, effective research encourages a "step to action" from its interpretation by teachers (Adelman, Jenkins & Kemmis, 1976). The findings of this study have been discussed and acted on by the teachers in their practice and professional development, and are being explored further in action research (Billman, 2002).

Subject knowledge is critical

As a further contribution to the literature, this study provides evidence that within a sociocultural perspective of pedagogy and curriculum in early childhood education, subject knowledge is a critical element for children and teachers. Fieldnotes identified that for children, in their interactions with teachers, subject knowledge learning was an interest and priority. From the children's perspective, subject content knowledge inquiry frequently formed the basis of the spontaneous curriculum experiences they chose and explored. Children constructed and negotiated meaning from these learning experiences.

Interactions designed to develop cognitive skills may lead children to subject knowledge. The foundations of critical thinking are laid in such interactions and support early childhood's integrated experience-based approaches that foster choice, inquiry, initiative and independence. Yet to think, theorise and problem-solve, children need to have something of interest and relevance to them to theorise about. Two children in the study demonstrated this, in the vortex tube interaction, and in the episode with magnets. In short, cognitive learning processes require subject knowledge to make the learning meaningful, understood and remembered. It is argued that subject content knowledge is the mediating link between theories of cognitive-constructivism and social-constructivism. Coalescence is established between knowledge acquisition and knowledge construction as processes of inquiry and participation. In these processes, the importance of teachers having sufficient subject knowledge in order to respond meaningfully to children's interests and inquiries is highlighted.

Moreover, Edwards and Knight (1994) argue that subject learning also needs to be more overt for children to develop a sense of academic self-concept, that is, a sense of self as a successful learner. Therefore an emphasis on subject learning is in keeping with the current focus in Aotearoa/New Zealand on dispositions for learning (Carr, 2001a). Moreover, in this study, "being a scientist", "being a technologist" and "being nearly five" are examples of Carr's (2001b) concepts of learning orientations for children that incorporated significant subject learning. Increased opportunities to recall and reflect on learning experiences and genuine opportunities to contribute meaningfully would be in keeping with a sociocultural view of the child as capable and assist children's metacognition.

Limitations of the study

The present study took place in one specific context, a middle-class kindergarten community in Auckland. The beliefs expressed in this study represent the views of these teachers, parents and children at that time. Furthermore, while beliefs have been established as enduring, they are also alterable through experience. In other settings, the beliefs expressed would reflect the goals and values of the relevant culture and community and may not correspond to the views espoused in the present study. This diversity is consistent with sociocultural theory. Moreover, early childhood education in Aotearoa/New Zealand values diversity in its curriculum approaches (Ministry of Education, 1996, 1998).

The present study is not intended to be interpreted as seeking a "best" approach to curriculum and planning. However, it can be interpreted as exploring an example of "wise" practice (Goodfellow, 2001), curriculum and pedagogy that is "contextually located and enacted by knowledgeable, thoughtful and sensitive professionals" (p. 1) within one early childhood learning community. So while it is acknowledged that this early childhood setting may be unique, the findings of this case study add knowledge to the researcher's context and frameworks, that is, understanding of sociocultural theory and early childhood curriculum and pedagogy. The implications and recommendations of this chapter are intended for consideration in the context of Aotearoa/New Zealand, although, as with any case study, further generalisable implications may be possible in other contexts (Cohen & Manion, 1989).

Further research

The following suggestions for further research that arise from this study have the potential to add to the knowledge base of early childhood education.

1. Although this study highlighted the contribution of home and centre experiences to children's knowledge, the links between these were not fully investigated. Studies of the knowledge base children bring from home to the centre setting, and how this is enriched and extended by teachers would add further to studies of both funds of knowledge (Moll, 2000; Moll, Amanti, Neff, & Gonzalez, 1992) and subject knowledge. With enhanced understanding of children's prior knowledge and

interests, teachers and children may further co-construct and extend children's knowledge.

2.   The findings of this study support that teacher beliefs have an impact on the curriculum and pedagogy provided for young children. Yet the kinds of beliefs teacher education should instil, including those about subject content knowledge, are currently a matter of potential debate. Research needs to be undertaken to provide evidence that certain beliefs are related to positive outcomes for both teachers and children. In this way, stakeholders can be persuaded of changes required in teacher education, policy and practice.

3.   The teachers in this study reported varying levels of confidence in subject knowledge, largely in accordance with personal experience or in relation to the relevance of learning provided during teacher education. Further studies of teachers' confidence with subject knowledge and links to children's learning are required. These studies could usefully follow action research methods, focusing on teams of teachers as communities of learners and inquirers. Practitioner research is another positive move toward meaningful change in learning and teaching practice in early childhood education. These studies may contribute to identifying what kinds of subject knowledge, and to what depth, are required to cater for children's baseline learning in subjects deemed critical, such as literacy and mathematics.

A way forward

A sociocultural curriculum presupposes developing a broad knowledge that will lead to a productive and satisfying adult life. Although early childhood discourse proposes that curriculum be based on children's knowledge and interests, teachers' knowledge and interests also expose children to novel learning opportunities that reflect the goals and values of the society. These learning experiences extend children's knowledge and thinking through co-constructed learning experiences that lead to shared understandings and new knowledge.

Findings of this study suggest that subject content learning is a central component in early childhood education. Content was the motivational linchpin that secured meaningful knowledge and learning strategies for children. Yet documentation of children's content

learning and the contribution of the teachers' subject knowledge to this learning, was largely neglected by the teachers. Just as Shulman (1986) noted that subject knowledge was a "missing paradigm" in relation to secondary teachers' professional knowledge, this can be argued in connection with early childhood teachers' professional knowledge base. This study provides evidence that within socially-constructed learning, the subject content knowledge teachers and children bring to interactions is crucial to meaningful learning and teaching.

Evidence supports the argument proffered to acknowledge subject knowledge more explicitly in a sociocultural perspective of early childhood curriculum and pedagogy. In this way, for example, the early literacy and numeracy knowledge promoted by participation in early childhood education may be more obvious, particularly to parents and ERO. It would also be consistent with the findings of the competent children study that at age ten, quality early childhood education made a long-term impact on mathematics and literacy competencies (Wylie, Thompson & Lythe, 2001).

Children's prior knowledge and their thirst for new knowledge are important findings of the study. This is consistent with other studies that reveal the extensive knowledge base children bring to their learning. Accordingly, teachers must recognise that in constructing new understandings, children, as experienced learners, bring applicable and relevant knowledge to learning situations, and utilise this knowledge meaningfully. Children have serious and deep interests in topics of their own choice, contributed to from a variety of sources and experiences, and engage in meaningful intellectual inquiry to further construct knowledge and shared understandings. Children's continuing inquiry and knowledge construction is dependent on the meaningful responses of the adults in their lives. Meaningful responses depend on knowledgeable teachers willing to extend their own subject knowledge to support children's learning (Cullen, 1999), in order to be "warm demanders", maximise learning and utilise critical "unreturning moments" (Meade, 1997, p. 36).

Learning community approaches consistent with sociocultural theory have potential in both early childhood and teacher education and professional development to acknowledge this emphasis.

We need to be able to listen, see and let ourselves be inspired by what children say and do, and keep children's hypotheses, questions, theories and fantasies alive, and to study how they search for answers and make meaning in the world (Dahlberg, Moss & Pence, 1999, p. 137).

Building on Edwards and Knight's (1994) ideas, the challenge for early childhood teachers is to assist children to organise experiences of the world in ways that will enable them to construct broader and deeper subject knowledge as they become more competent learners. Teachers need to do this without affecting the curiosity, confidence and fun that are features of young children's play as they try to make sense of their experiences with the people, places and things in the world around them. While maintaining a play-based and integrated philosophy, the subject knowledge of both teachers and children requires more explicit attention. Purposeful teaching and learning occurs when teachers' subject knowledge contributes to choosing appropriate pedagogical strategies and to making learning experiences meaningful for children. Early childhood teachers professional knowledge of subjects and pedagogical approaches can assist them to construct knowledge with children in ways that relate meaningfully to children's prior knowledge and everyday lives, and that guide children towards satisfying adult lives. The present study has identified that children's subject knowledge and teachers' subject knowledge are of vital importance in early childhood curriculum and pedagogy. It argues for enhanced awareness of subject knowledge in early childhood learning, teaching and curriculum in Aotearoa/New Zealand.

Epilogue

At the beginning of 2002, the following events happened in the kindergarten that was the research setting for the present study. These were, at least in part, prompted by the findings of the study.

➢ Two morning sessions each week have been extended by one hour to four hours in duration. The additional income this provides pays for the employment of a teacher aide during all five morning sessions. The teacher aide is utilised for administrative and domestic tasks that often interrupted teachers' sustained interactions with children during the research, for example, telephone calls, enrolment enquiries, first aid such as sticking plasters for minor injuries, children's requests for additional equipment, and maintaining craft areas such as collage and paints.

➢ Teachers began a quality review, including the use of action research, to make parent involvement in kindergarten sessions more meaningful to parents and beneficial to children's learning.

➢ Children began bringing their own morning tea in lunch boxes so that food preparation was no longer a task for parent-helpers participating in sessions.

➢ Curriculum documentation began to include planning, assessing and evaluating the small group teaching sessions, and more frequent reference to children's subject content learning.

➢ Volcanoes became a more prominent area of interest for several children. An excursion to Rangitoto Island took place. Teachers researched geological features of Auckland's landscape amongst the subject knowledge required to contribute to and support children's learning. Parents helped access resources such as maps. Both spontaneously, and when prompted through questioning in preparatory experiences, children demonstrated depth of prior knowledge that had the teachers "in awe of their understandings and insights" (Jordan, 2002, p. 4). Following the excursion, conversations between children and teachers while constructing volcanoes in the sandpit, were reported as demonstrating greater breadth and depth of knowledge of volcanoes than conversations that occurred during the period of this study.

In addition, consistent with, and perhaps acting on her beliefs, *"I like the family involvement in public kindergarten, I really like it, and for me that is a really good part of the job"*, Mary left her kindergarten teaching position to co-ordinate a family day-care programme.

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Appendices

Appendix 1

Information sheet to teachers

PARTICIPANT INFORMATION SHEET (FOR TEACHERS)

Title of research project:
Subject content knowledge in the early childhood curriculum in New Zealand: The beliefs of teachers, parents and children.

Researcher
Helen Hedges
I am a Master of Education (Early Years) student at Massey University College of Education. I have previous experience in secondary school and early childhood teaching, and have recently had eight years as an early childhood teacher educator, the last five at AUT. I am now pursuing my postgraduate degree full-time.
Contact telephone number: .... or e-mail phrc@ihug.co.nz

Supervisors
Joy Cullen and Jenny Boyack, Massey University (Palmerston North)
Contact telephone number: 06 351 3355 or e-mail J.L.Cullen@massey.ac.nz and J.E.Boyack@massey.ac.nz

Information about the project:
In New Zealand, 'early childhood education' refers to programmes for children aged birth to 5. Te Whāriki leaves interpretation of subject content (the knowledge dimension to the curriculum) to the teachers, unlike the curriculum (Ministry of Education, 1993) children go on to experience in junior primary settings (5-8 years) which prescribes subject content. This study proposes to focus on subject content knowledge in early childhood education in New Zealand.

This kindergarten is a case study for the research, and the project will investigate the views held by teachers, parents and four-year-old children in the setting, specifically in relation to an excursion undertaken in 2001. I have approached the kindergarten association and management responsible for this kindergarten and they have given me permission to approach you for this research.

All teachers, parents accompanying children on the excursion, and four-year-old children are invited to participate. Participation is voluntary. If you agree to participate you will be required to spend about an hour participating in each of two focus group discussions (ie. one hour of discussion on two different dates with the other teachers). There are no right or wrong views to these focus group questions – I am interested in your views. The place and time of these focus groups will be negotiated with you. These focus groups will be audio taped. The tapes will be kept in a locked filing cabinet at my home and destroyed at the end of the project. During the excursion, I will take photographs and make observation notes of children's questions and comments. You will also be asked to keep notes of children's questions and comments during the excursion. In addition, I will ask permission to attend curriculum planning and evaluation meetings associated with this excursion to make notes and take copies of

planning and evaluation material that does not involve child assessment data. I will also ask permission to observe relevant learning and teaching interactions between you and participant children before and after the excursion. These observations will take place during your morning sessions for approximately six weeks.

There will be no pressure to participate and your participation will not affect your employment or the programme that you provide for children in any way. I am aware that teachers having researchers in the educational setting is a further event in the busy daily life of the kindergarten. I will respect the routines and policies of the kindergarten and allow you to continue in your roles without inconvenience. In the unlikely event of any changes being required, these will be carefully negotiated with teachers and management. Special care will be taken not to disrupt the normal environment of teaching and learning interactions and relationships between teachers and children during the research process.

While anonymity cannot be guaranteed because of the use of group interviews, pseudonyms will be used in the research report. However, to protect confidentiality, each adult will be asked to sign a confidentiality clause as part of the consent process. The focus group discussion will be transcribed by someone not associated with the research who will also sign a confidentiality clause. Your responses will be confidential to the researcher and supervisors and anonymous, as no information will be collected that identifies you in any way.

Please be aware that you are able to withdraw from participation by contacting my supervisors or me, any time up until the data has finished being collected.

You will have the opportunity to read and check the written transcripts of the focus group sessions before I undertake analysis of the data. The findings will be written up firstly as a thesis, but may also be part of a future conference presentation or journal article.

To summarise:
- you have the right to choose or decline to participate in this research
- you can participate as much or as little in the focus group sessions as you wish and not answer any particular questions
- you can withdraw from this study at any time up until all the data has been collected
- please feel free to contact me at any time if you have any questions about the research
- the information you provide will be confidential
- you will have access to a summary of the findings of the project

Thank you for taking time to consider participation in this study.

Appendix 2

Letter to parents and children

July 30 2001

Dear parents/whanau, caregivers and four-year-old children of Oaktree Kindergarten

Thank you for your welcome to your kindergarten. I have enjoyed getting to know many of the children and parents over the last week or two. I now invite you to consider participating in a research project for my Master of Education degree at Massey University. This project will investigate your views on the place of content as part of children's learning in the early childhood curriculum in New Zealand. I expect that the information will be of interest to the professional and research communities of early childhood education.

Please read the enclosed information sheet carefully. If you decide to participate and/or give me permission to approach your child to participate, please return the form expressing interest in the project so that I can contact you further. If you consent to participation, please keep the information sheet. Signatures on consent sheets will be collected later.

If you have any questions or wish to know more before deciding whether or not to participate, please do not hesitate to chat to me during one of the kindergarten sessions, telephone me on ...., or contact me by email at phrc@ihug.co.nz .

Thank you for taking time to consider this project.

Yours sincerely

Helen Hedges

Appendix 3

Information sheet to parents and children

PARTICIPANT INFORMATION SHEET (FOR PARENTS)

Title of research project:
Subject content knowledge in the early childhood curriculum in New Zealand: The beliefs of teachers, parents and children.

Researcher
Helen Hedges
I am a Master of Education (Early Years) student at Massey University College of Education. I have previous experience in secondary and early childhood teaching, and have recently had eight years as an early childhood teacher educator, the last five at Auckland University of Technology. I am now pursuing my postgraduate degree full-time. My contact telephone number is .... or e-mail phrc@ihug.co.nz

Supervisors
Joy Cullen and Jenny Boyack, Massey University (Palmerston North)
Contact telephone number: 06 351 3355 or e-mail J.L.Cullen@massey.ac.nz and J.E.Boyack@massey.ac.nz

Information about the project:
In New Zealand, 'early childhood education' refers to programmes for children aged birth to five. This study proposes to focus on content knowledge in early childhood education in New Zealand. This kindergarten is a case study for the research, and the project will investigate the views held by teachers, parents and four-year-old children in the setting, in relation to the trip undertaken to Kelly Tarlton's this term. I have approached the kindergarten association and teachers responsible for this kindergarten and they have given me permission to approach you and your children for this research.

All teachers, parents accompanying children on the excursion and four-year-old children are invited to participate. Participation is voluntary.

Parents' participation
If you as a parent agree to participate you will be asked to keep notes of children's questions and comments and adult responses during the excursion.

In addition, some parents will be asked to spend about an hour participating in each of two focus group discussions (i.e. one hour of discussion on two different dates with up to nine other parents). One discussion will occur before the excursion and one afterwards. There are no right or wrong answers to these focus group questions – I am interested in your views. The place and time of these focus groups will be negotiated with you. These focus groups will be audio taped. The tapes will be kept in a locked filing cabinet at my home and destroyed at the end of the project.

While anonymity cannot be guaranteed because of the use of group interviews, pseudonyms will be used in the research report. To assist confidentiality, each adult

will be asked to sign a confidentiality clause as part of the consent process. The focus group discussion will be transcribed by someone not associated with the research who will also sign a confidentiality clause. Responses will be confidential to the researcher and her supervisors and anonymous, as no information will be collected that identifies you or your child in any way.

Please note that as a parent accompanying the excursion, you may choose to participate in this project but choose for your child to not participate. Or your child may be keen to participate and you are happy to support this participation, but you may choose not to as a parent. There is **no pressure for you or your child** to participate and your participation will not affect your child's education or relationships with teachers in any way.

If you are part of the focus groups, you will have the opportunity to read and check the written transcripts before I undertake analysis of the data. The findings will be written up firstly as a thesis, but may also be part of a future conference presentation or journal article.

Children's participation
If you agree <u>for your child to participate</u>, <u>your child's consent will be sought</u> to be observed by me in the kindergarten before and after the excursion and during the excursion. During the excursion, I will take photographs and make observation notes of children's questions and comments. The photographs will be given to the kindergarten at the completion of the research. In addition, some children will also be involved in audio taped group discussions before and after the excursion.

Please be aware that you or your child are able to withdraw from participation by contacting my supervisors or me, any time up until the data has finished being collected.

To summarise:
- you have the right to choose or decline to participate as a parent in this research
- you have the right to choose or decline for your child to participate in this research
- you can participate as much or as little in the focus group sessions as you wish and not answer any particular questions
- you can withdraw yourself and/or your child from this study at any time up until all the data has been collected
- please feel free to contact me at any time if you have any questions about the research
- the information you and/or your child provide will be confidential
- you will have the opportunity to verify the transcripts of the interviews
- you will have access to a summary of the findings of the project

Thank you for taking time to consider participation in this study.

Appendix 4

Teachers' consent sheet

Consent to Participation in Research

Title of project:
Subject content knowledge in the early childhood curriculum in New Zealand: The beliefs of teachers, parents and children

Researcher: **Helen Hedges**

Project Supervisors: **Joy Cullen and Jenny Boyack**

- I have read and understood the information sheet provided about this research project.
- I have had an opportunity to ask questions and to have them answered.
- I understand that I may withdraw myself or any information that I have provided for this project at any time prior to completion of data collection. The final date for data collection is September 21.
- I agree to maintain confidentiality with respect to the names and information given by the other teachers in the focus group.
- I agree to allow the audio taping of the focus group sessions I am involved in.
- I understand that I will be able to verify my contributions to the focus group sessions
- I agree to allow the researcher to observe learning and teaching interactions in the kindergarten.
- I agree to allow the researcher to attend curriculum planning and evaluation meetings.
- I agree to allow the researcher to take photographs and make observation notes during the excursion.
- I understand that a pseudonym will be used instead of my name in the written report of the project.
- I agree to take part in this research under the conditions outlined in the information sheet.

Participant signature: ....

Participant name:

Date:

Appendix 5

Parents' consent sheets

Consent to Participation in Research

Title of project:

Subject content knowledge in the early childhood curriculum in New Zealand: The beliefs of teachers, parents and children

Researcher: **Helen Hedges**

Project Supervisors: **Joy Cullen and Jenny Boyack**

- I have read and understood the information sheet provided about this research project.
- I have had an opportunity to ask questions and to have them answered.
- I understand that I may withdraw myself or any information that I have provided for this project at any time prior to completion of data collection. The final date for data collection is September 21.
- I agree to allow the audio taping of the focus group sessions I am involved in.
- I understand that I will be able to verify my contributions to the focus group sessions
- I agree to allow the researcher to take photographs and make observation notes during the excursion.
- I understand that a pseudonym will be used instead of my name in the written report of the project.
- I agree to take part in this research under the conditions outlined in the information sheet.

Participant signature: ....

Participant name:

Date:

Consent to Participation in Research

(consent form for parents of participant children)

Title of project:
Subject content knowledge in the early childhood curriculum in New Zealand: The beliefs of teachers, parents and children

Researcher: **Helen Hedges**

Project Supervisors: **Joy Cullen and Jenny Boyack**

- I have read and understood the information sheet provided about this research project.
- I have had an opportunity to ask questions and to have them answered.
- I understand that I may withdraw my child or any information that she/he has provided for this project at any time prior to completion of data collection. The final date for data collection is
- I agree to allow the audio taping of the focus group sessions my child is involved in.
- I understand that I will be able to discuss my child's contributions to the focus group sessions with her/him
- I agree to allow the researcher to observe my child during learning and teaching interactions in the kindergarten and on the excursion.
- I agree to allow the researcher to take photographs and make observation notes during the excursion.
- I agree for my child to take part in this research.

Parent/whanau/guardian's signature(s) of consent:
(1)
(2)

Parent/whanau/guardian's name(s) and contact telephone number(s):
(1)
(2)

Child's name:

Date:

Appendix 6

Children's consent sheet

Consent to Participation in Research
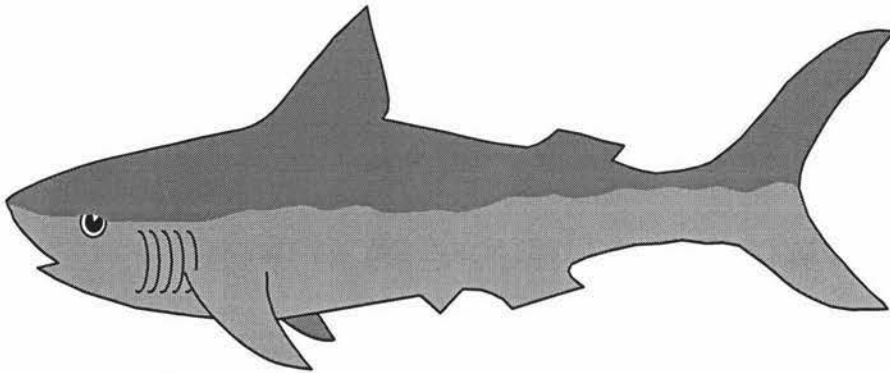
Title of project: **Subject content knowledge in the early childhood curriculum in New Zealand: The beliefs of teachers, parents and children**

Researcher: **Helen Hedges**

Project Supervisors: **Joy Cullen and Jenny Boyack**

My name is:

I have talked to Helen about why she is at my kindergarten. I am happy to talk to her about the trip to Kelly Tarlton's we are going on. I am also happy to talk to her again after the trip about what we saw and learned. I will let her tape the talks we have. I will let her watch me playing with and talking to teachers and children in the kindergarten and on the trip.

Child's signature:

Appendix 7

Confidentiality agreement for adult focus groups

ADULT FOCUS GROUP'S AGREEMENT TO CONFIDENTIALITY

With regard to the thesis: Subject content knowledge in the early childhood curriculum in New Zealand: The beliefs of teachers, parents and children being undertaken by Helen Hedges

- We agree to maintain confidentiality with respect to the names and information given by other members involved in the focus group.

Name: Signature:

Appendix 8

Focus group topics and questions

First focus group discussions (prior to excursion)

Teachers
- Why did you choose to become a kindergarten teacher?
- What do you think teaching and learning involves in a kindergarten?
- What is the involvement of parents?
- Please describe your curriculum planning and evaluation processes
- What is the value of excursions as part of curriculum?
- What are children's expectations of the excursion?
- What do children already know about Kelly Tarlton's and sea creatures?
- What kinds of knowledge do you think are needed by teachers and parents to support children's learning (in general/on this excursion)?

Parents
- Why did you choose kindergarten for your child(ren)?
- What do you think teaching and learning involves in a kindergarten?
- What is the involvement of parents?
- What is the value of excursions as part of curriculum?
- What are children's expectations of the excursion?
- What do children already know about Kelly Tarlton's and sea creatures?
- What kinds of knowledge do you think are needed by teachers and parents to support children's learning (in general/on this excursion)?

Children
Goal: to establish comfort for children in the research situation and ascertain children's prior knowledge of sea creatures and their expectations of the excursion

- What things do you like to do at kindergarten
- What things do you like to do at home
- What other trips have you been on with kindergarten?
- What did you learn?
- Who has been to Kelly Tarlton's before?
- What do you already know about sea creatures?
- What do teachers need to know to help you learn?
- Things/questions they want to find out about at Kelly Tarlton's

Second focus group discussions (after excursion) – photographs and diary notes used as recall items

Teachers
- What children talked and asked about during the excursion
- What children learned from the excursion
- Links to subject learning
- Exploration of early childhood/primary transition and 'preparation' ideas raised at first focus group discussions
- Early childhood teacher's knowledge base – comparison with primary teacher's
- Impact of teacher education programme on knowledge base
- Probe general versus specialised content knowledge
- Researcher effect/influence

Parents
- What children talked and asked about during the excursion
- What children learned from the excursion
- Links to subject learning
- Exploration of early childhood/primary transition and 'preparation' ideas raised at first focus group discussions
- Early childhood teacher's knowledge base – comparison with primary teacher's
- Probe general versus specialised content knowledge
- Researcher effect/influence

Children
Goal: to ascertain children's perceptions of the experience, the knowledge gained and beliefs about adults' knowledge.
- What did you see and learn about at Kelly Tarlton's?
- What did you like best at Kelly Tarlton's?
- Questions/answers related to content knowledge of sea creatures
- What questions did you ask the teachers or your Mum?
- Perceptions of differences between kindergarten and junior primary teaching and learning

Appendix 9

Excerpts from parent and teacher diaries

Parents' diaries

i) Cara's diary

- reporting conversation with Frankenstein after excursion

F "I had fun and played, I didn't actually play eh Mummy? What did you see Mummy?"

C "I saw penguins. What can you tell me about penguins?"

F "It was fun looking at them and their enemies."

C " Who were their enemies?"

F "Sea enemies, whales and sharks. I meant whale sharks and seals. Whale sharks are the biggest in the whole entire universe. The girls are penguins and the boys are sharks and I will write it down for Helen."

C "Why are the girls penguins?"

F "Because that's what it was, they chose to be penguins."

C "in your small group?"

F Yes. I'm called the sharks so I might as well draw a whale shark. It is a happy whale."

C "Do you know sharks and whales are different? There is a shark called a whale shark. Let's go find a picture."

F "Actually I know that and my homework's all done."

C "Why do you think it's homework."

F "Because I made it homework."

ii) Rose's diary

- conversation with Shark one day prior to excursion

S "Is it today we're going to Kelly Tarlton's?

R "Tomorrow. What are you going to see?"

S "Hammerhead shark. What is that?"

R "I don't know. How did you know the name?"

S "I just know the word."

- conversation with Shark three days after the excursion

S (is walking with a waddle) "Mummy, penguins walk like this, am I right?"

R "Yes, very well. You really look like (a) penguin."

S "Why do penguins like snow?"

R "I think they are made to be that way."

S "Why?"

R "All kinds of animals live different lives. Some like to live in cold areas, others like to live in hot areas. I guess penguins like to live in cold, snowy areas."

S "Mummy, do you remember a train in Kelly Tarlton's?" Why does it stop and go like that?"

R "Because you can look and watch the penguins through the window. If the train goes very fast, you wouldn't be able to see them."

S "You know Mummy, there was a shark biting a seal popping up and going down, how does it work like that?"

R "I guess probably they have an electric system operating that."

S "Is there a switch under the water?"

R "I am not sure. I don't think it could. Next time we visit we can ask."

iii) Sue's diary
- conversation between Sue, Penguin 1 and her brother the day before the excursion
P "Mum, do you know there's only one more sleep to go before Kelly Tarlton's?"
S "That's exciting, isn't it?"
brother "P – are you going in a bus with 'kindy' written on it?"
P "No, buses don't say that, and they have numbers."
Brother "I know. I was just seeing if you did."
The children get an encyclopaedia out to look at sea creatures and talk about them.

iv) Jo's diary
- reported conversation one day prior to excursion
On the way home from music, Orca is talking about one sleep until KT's. Discussion about what we will see. Whales, sharks and dolphins. I asked him if he really thought he a whale might be there. We talked about the size of whales and decided that it wouldn't fit. He is looking forward to seeing the 'wobbygone'(?)
- reported conversation on the bus on the return trip from the excursion
Later on that day he talked about the 'leather jacket'. He was fascinated about a fish and something you wear. We talked about what a fish called 'leather jacket' might be like to eat. Orca goes fishing with his Granddad sometimes. We usually get snapper to eat. Orca could pick out the snapper at KT's. He was also really excited to see the wobbegong shark swimming.

Teachers' diaries
v) Shaina's diary
- reports Orca telling her about interaction with Kate two days prior to excursion
O "A whale shark is bigger that the other things. We measured it with a piece of string. I had to walk right over to here."
S "Goodness, is that how big it is?"
O "Yeah. Imagine one of those things in your house. It might break your house. Imagine its tail sticking out of your window. A whale shark is about 15 metres."

- conversation with Kitten two days prior to excursion
S "Are you excited about tomorrow?"
K "Yes! I'm going to see a shark and a whale. I want Mary to go into the water so the sharks can scare her. You might have to tell her to bring her togs. … I'm going in Mary's car."
S "Are you going in Mary's car tomorrow?"
K "Yeah."
S " But I think Mary's going on the bus."
K " Well, my Mum could drive her car."
S "What if your Mum isn't insured for Mary's car? What if she had an accident?"
K "But my Mum drives carefully."
S "Well what if someone else isn't driving carefully?"
K "Everybody drives like my Mum."

- report of children's dialogue as they re-watch a documentary on video about sharks with no adults present

"What's that?"

"A shark."

"A killer whale."

"No, a shark, we can see it's a shark."

"What are those things on the rocks?"

"Seals."

"Look – sharks!"

"I can see 'shark'" (referring to caption on screen)

"What do sharks like to eat?"

"Fish."

"People."

(Children watch a shark eat a seal)

"What happened to the seal?"

"The shark ate the seal."

"But I thought it only eats baby seals."

"It's a great white shark, it eats anything."

"This is so gross."

"The shark is bleeding." (shark had blood around its mouth from eating the seal)

"Keep an eye out for the hammerhead shark."

"The shark! I saw its tail!"

"Look, there's a tag on its back."

"The shark scared me!" (a close-up shot of a shark jumping out of the water)

vi) Mary's diary

- reports a list made two days prior to the excursion at small group time of sea creatures children have named and expect to see

turtles, frog, penguins, whale, shark, polar bear, dolphin, octopus, crayfish, puppet show, fish, crabs, seahorse, starfish, stingray, shells, book, big fish, 'snake thing'

- reports a conversation between Bunny, V. and Mary in the shark tunnel during the excursion

B "What's that spiky thing?"

V "What – that one?"

B "It looks like a starfish."

V "I see big whales and fish."

B "I've been in here before. Dad got sick, he couldn't get off this. Maybe some fish like the dark. Look, Mary, there's a shark!"

M "Mmm."

B "What happens if we put out fingers on the glass?"

V "There's sharks everywhere!"

B "One of the sharks is bleeding. Look, a shark up there too."

- reports Bunny's dialogue Bunny in the education area

"Mary, look! I'm going to see the starfish. Look, I'm holding it!"

"This one looks like a sea cucumber, like Jim said."

"Let's go to see the starfish again."

- reports a conversation between Bunny and Mary on the bus home from the excursion

B "I think G. and B. took a fish home. I saw it in their hands when I got on the bus."

M "What sort of fish?"

B A starfish. They could have put it in their pocket."

M "Their pocket would get wet."

B "No, they dried it first. ... Look, there's an island. Do you think it's big or small Mary?"

M What do you think?"

B "I think it's big but the houses are little."

M "So compared to the houses, the island is big."

B "Yes, the houses are far away and they are this big (indicates with fingers) but the island is this big (indicates with hands)."

vii) Kate's diary
- reports small group time discussion two days prior to excursion; children are looking at a photograph album of a previous excursion to Kelly Tarlton's

Frankenstein "I'm in the bus at KT's – if you see that island there that's KT's. They're the front wheels and they're the back wheels and that's how you get up to the bus, on that ladder. That's a clown juggling, that's (name), actually that's (another name), my friend, that's me, I'm holding his hand. We are at KT's."

- reports small group time discussion three days after the excursion (first day back at kindergarten); children are looking at the photographs album of the excursion

At small group time I asked the children if they would like to draw some of the things they saw at KT's. With the photos and library books, much discussion was sparked. The children mostly talked about the sharks, standing on the buckets, stingrays, penguins, sharks, the bus ride. It was interesting to note more detail in the pictures today than on Thursday *(day prior to excursion)* when I asked them to draw what they thought they might see.

Appendix 10

Excerpts from fieldnotes

July 23

Observed Shaina's group time. Drawings on the wall from last week of land & sea creatures. Today to do screen-printing. Children to draw a land or sea creature. Group of three girls drawing jellyfish (Starfish said! – should have known 'royal we'). I ask D. - "tell me about your jelly fish" D. "it's a blue-ringed octopus, can't you see its eight tentacles?" Has been to a museum in Chch and seen them. Knows they are tiny and sting and hurt people. Starfish wants to draw a penguin and asks how to do this. I ask her what a penguin looks like - she says black and white. Shaina finds a book for Starfish to find a picture of a penguin. Starfish notices a newspaper article on the wall with a picture of a penguin in a jersey. Orca (the boy whose profile has largely initiated the Kelly Tarlton's trip) draws a cheetah with spots. (The name for this group of children is the Cheetahs). He spends longest at the screen-printing.

July 24

I took in the Encarta information about shark reproduction that Chris *(my son)* had found. Shaina's group shown goggles /mask/snorkel/flippers/boottees /gloves. Discuss diving for fish, use of snorkel. Discuss fishing quotas. Shaina asks why you can't take as many fish or mussels or scallops as you want. Starfish "there would be none left for other people". Children are invited to bring in things they have made, photos, newspaper cuttings to do with the sea. Shaina asks how people diving deep down can breathe. Children are unsure, so Shaina uses stimulated recall about the firemen's visit last term. The children remember the tanks on their backs. Shaina tells them the same thing is used in deep water. B. asks Shaina that she has got a tank. Shaina says yes and asks if she would like her to bring it in. B. says yes and "you could show us on the trip". Orca misses this information as he is on a school visit.

July 25

Prior to the children's arrival, Shaina is thinking about setting up sinking and floating experiences for her group. She searches the kindergarten for suitable items, but cannot find sufficient. She tries to make a sinking item but it doesn't work. She comments that she doesn't think she could explain the mechanism of/explanation for sinking and floating and decides to abandon the experience until she has had time to research this.
**An example of a teacher recognising that her subject knowledge was insufficient to maximise children's experience and understanding, and needed development before provision.

(Also turned out later that her use of floating and sinking during the ERO visit had been criticised as not coming from the children's interests – probably knocked her confidence.)

At group time, children talked about their 'news'. One child said she had been to Kelly Tarlton's. Shaina told the group they were having a kindergarten trip to Kelly Tarlton's this term. She asked what they thought they might see. Penguins and sharks were the common reply. Several said they had been there before and that it is very cold.

Later, on the deck, Orca told me he was looking forward to going to Kelly Tarlton's, as he likes sharks. He also noted that there are fire worms, which swim at the bottom of the ocean and sting people. He told me "It is my idea to go to Kelly Tarlton's. I went a long time ago when I was three. This time I will see more because I am bigger". He tells me that at Kelly Tarlton's we're not in danger of sharks because of the protective glass. He builds a rocket out of Duplo, blasts it off and travels to Mars, the moon, Saturn, Jupiter and Pluto before returning to earth.

Later he has an extensive conversation with Shaina, naming many different types of sharks and whales, asking about penguins (guessing where they lived in the world and then checking this out in a book and with a globe). Shaina asks him what he would like to find out and he repeats that he wants to know how sharks have babies, he also wants to know how whales and fish have babies. (NB later copied as documentary evidence after consent obtained for participating in research). Shaina is capable and relaxed with him until he loses concentration (approx 30 mins). She questions well, encourages Orca to look for books to find answers etc. (NB. Verbatim not recorded – want teachers to feel comfortable about me first). When Orca's caregiver picks him up at lunchtime, she tells us her daughter has recently had a baby (now three weeks old) and Orca has been very interested in this. Another child she looks after has a fascination for planets.

July 30
Observed Kate's group time. She asked the children for ideas about what they would like to do during group time. The first two children said painting and drawing and several others took their cues from them. The other common theme of requests revolved around parties and party food. Kate then asked the group if they would like to do cooking - this was well received and children suggested cakes and scones. She also asked if they would like to do science experiments and this suggestion was met with enthusiastic agreement. Kate suggested they make bread (rolls) tomorrow and asked each child to bring a small piece of cheese.
***This was a good example of how curriculum planning can be based on a mix of children's interests and teacher interests and how important it is for a teacher to stimulate interest and ideas.

August 7
Shaina's group is making pikelets today. As children leave the mat, she ensures they wash their hands. Penguin 1 is seated immediately on Shaina's right for the cooking session. Shaina talks about the frypan becoming hot and the potential for being burned. She reassures the group that each will get a turn and that she will go in a circle to ensure this. She collects the recipe from the table beside her and tells the group they are going to make double quantity as "there are a lot of us". As promised, the children take turns to measure flour, sift it in, add baking powder. One girl pretends to lick the spoon - Penguin 1 calls out "Oh no, don't do that!" Shaina - "Now I've got to read the recipe because I don't know what to do next". Reads aloud from recipe "Beat together the eggs and sugar. I'll do the eggs as they are tricky and we don't want shell in our pikelets". Passes the bowl around for children to see the egg yolks and egg whites. The children take turns to whisk the eggs and the sugar. Egg/sugar mixture and milk are added. Shaina tells them

everyone is going to have a turn whisking the mixture until it is smooth and creamy. The children understand this concept; each have a few stirs and pass it on. Shaina explains that she is going to put butter in the frypan - Penguin 1 "so they don't stick. My Mum always does that or else she won't get them off". Shaina explains that the butter creates a layer of fat to stop what is being cooked sticking to the frypan. Penguin 1 is stirring the mixture "Why is it clicking I wonder?" (referring to the noise of the whisk in the aluminium bowl). Shaina takes a turn and whisks faster than the children, asking them to see if it is smooth and if there are any lumps. Penguin 1 "It's pretty tricky to mix now". Shaina says she is going to turn the frypan on. Penguin 1 "It's still cold, it's got to heat up. That's not melted butter (pointing to a large lump of butter on a plate) but it will melt in the frypan". Shaina holds her hand above the frypan. "If I hold my hand here I can feel it's getting hotter. If I put fat in it might splatter so I won't put my hand over it then ". Puts some butter in. Penguin 1 "It's getting bubbly. You'll get burnt if you touch it". C spoons some of the mixture into the frypan to form five pikelets. Penguin 1 "If you pour it together they might go together and you'll have to cut them apart". Shaina "Does anyone know when the pikelets are ready to turn?" Penguin 1 "when it's bubbly on top". Shaina shows how she will flip them with a fish slice and Penguin 1 checks that she has washed it first. Shaina asks what happened to the pikelets - children respond that they have "risen", "got fatter", and "gone brown". Shaina puts a second lot of mixture in the frypan. Another group has finished their group time and pass by these children. Shaina says that those who want to go can do so and will be told when the pikelets are ready to eat. Penguin 1 is one of five who stay. Shaina tells them to tell her when she needs to flip the pikelets. Penguin 1 "You can't really hear the bubbles any more". Shaina "Can you hear it sizzling?" Penguin 1 "a teeny bit". Penguin 1 (to me) "Do you know what? My daffodil is already dead. We put it down the gurgler." (This refers to the daffodil given to her two weeks ago). Bunny says, "I got burned with hot water when mummy was running a bath". Penguin 1 "Once my brother was cooking with Dad and he got burnt. He touched the frypan. They were cooking pancakes." There is slow progress with the pikelets. Shaina says perhaps she needs to turn the frypan up so they will go browner and cook quicker. Penguin 1 "It might go on fire if you turn it right up. (No reaction from Shaina). If you turn it up too far it will go on fire." Shaina responds "hopefully not because there is not much fat like there is in a deep fryer". Penguin 1 "If there was lots of fat right up to the top it would go on fire." The pikelets are now going blacker and crispy at the edges. Penguin 1 to Shaina "You better hurry up and turn them." "Hey Shaina, you nearly poked me in the eye with that knife!" They discuss how to hold knives safely. The pikelets are now all cooked. Penguin 1 goes outside to ask other members of the group if they would like to come in to eat one. Most do so. After she has eaten her pikelet, Penguin 1 goes outside to the sandpit. She mixes sand and water and puts four pieces on a blue plate. She approaches the teachers to offer her pancakes. As I take mine, she says the other one is for Kate "but oops I can't go inside". I offer to get Kate for her - "yes please". After Kate has eaten her pancake, Penguin 1 returns to the sandpit to do more cooking. She puts a large amount of sand and water into a container and then tips it onto a plate and shapes it quite high. (see photo). She picks this up, takes it to Mary and tells her she has made a cake. Mary asks what kind it is and Penguin 1 replies chocolate. She offers slices to other children, but then drops it into the sandpit.

She goes to a group of children with the guinea pigs and tells them she made a cake but that she has dropped it. She then begins other play.

August 10

Penguin 3 said to Hilary "We're going to make fans for everybody. I know how to make a fan. Get some paper and I'll show you". They go outside to carpentry table with paper, crowns and a stapler. At the carpentry table, Penguin 3 models for Hilary how to make a fan. She explains that you colour both sides because you can see both sides when you're finished. She then demonstrates the folding "you fold it like this, then over like this". Hilary copies successfully. Penguin 3 picks up the stapler. "You gotta check if there are staples. Oops! No!" She runs inside to look for a stapler with staples. The others are all empty, so Shaina helps them find spare staples. Penguin 3 competently puts these in the stapler and shows Hilary how the bottom is stapled and the fan folds out. She staples Hilary's fan for her. Hilary says, "Let's make one for you!" (i.e. the researcher). She does so successfully, while Penguin 3 teaches another child, Daphne, how to make a fan.

August 31
Penguin 1 and Penguin 2 decide their babies need a bath now. I ask them what they need to give their babies a bath. They tell me new clothes; you need a towel, soap and warm water - not too hot. Penguin 1 tells me you have to be careful not to get soap in the baby's eyes, you need to make sure the baby keeps warm, you must hold the baby safely and not leave them alone in the bath. She is going to dress her baby in a ballet skirt after the bath as she is going to ballet. I put some warm water and detergent in the doll's bath and take it onto the table on the outside deck. Penguin 1 and Penguin 2 take it in turns to use a wash cloth to bath the doll. Penguin 1 is very thorough and knows how to turn the doll over safely to wash its back. She then dries and dresses the doll and goes off to the sandpit. Soon, she is back. She tells me "She got dirty in the sandpit. I need to give my baby another bath. I rang the ballet teacher and said she didn't want to go today. She goes to ballet and dancing." I ask her what the difference is between ballet and dancing. "If you go to dancing you have to dance all time, but I haven't been to ballet so I don't know what you do. When I was about um two and three-quarters, we were going to go to the ballet. But I thought, nah, I thought it would be quite boring. I seen ballet when I was two. I'm holding her head like this to keep her head safe. Can you hold it for me while I come round your side?" I do so and Penguin 1 moves to the other side of the bath and turns the doll over. It slips out of the bath. I express dismay. She says: "It's only a doll. Soon she'll get in her ballet clothes again". She notes that on the table beside the bath "Oooh, it's all wet here". I tell her that sometimes babies kick and splash water. "My friend (name) has a sister (name) and she just splashes gently. She gets in the big bath now". I ask how old she is. "She's one now and (name)'s 3". ... Penguin 1 notices that the hose is going in the sandpit. She asks me to look after her baby so she can play in the sandpit without her baby getting sandy again. I say that I will and it is responsible of her to leave her baby with someone. "Yes, you don't leave babies on their own".

September 3 2001
Shopping list resource on deck. Large photographs of current products with the name underneath. Many children utilise this over the morning (photos, photocopies of Penguin 1 and Penguin 2's lists).

Penguin 2 asks me to select products for a shopping list of things that I need. I do so, and she spends the next twenty minutes writing the list for me. At one stage, she starts to write her name at the top of the page and is interrupted after '(first three letters)'. I ask her if she thinks I need (item), and when she looks puzzled I point to the '(item/name)'. "Oops! I didn't finish my name!" She does so, then asks me how to write my name so she can write it on the other shopping list sheet. I write it down and she copies this also.

September 5, 2001
When I first see Starfish today, she is on the swings. She calls out to me "I went on my first school visit yesterday. I learned to read." She has brought the poem she learned. She gets it out of her bag to read to me (photocopied for documentary evidence). I ask her to point to the words as she reads them. She accurately points to the lines but not the exact words as she says them. Penguin 2 and Penguin 1 have been on the same visit. Penguin 2 tells me that there is a new new entrant class starting next week when she starts school. There will only be four children in it at that point but others will join them during the rest of the year (including several from Oaktree – Penguin 1 and Starfish among them).

I show Penguin 2 the basket of shopping I have brought in – I have bought the shopping from the list she wrote me on Monday. She gets out the cards and the groceries and checks these off against the list (photos). I try to look at the docket with her (which I enlarged on the photocopier) but as the product names are abbreviated and in capitals they don't look right to her and she is not particularly interested in the cost of each item. I tell her Rebecca *(my daughter)* said she'd rather have bought Penguin 1's list as there were sweets and Moros on it. Penguin 2 giggles and says she'd like to write a list for Rebecca of the things she likes. She helps me select items and writes the list. She notes that the letter 'i' has a square on top rather than a dot and that some letters are not formed correctly ('k' and 'q') on the pictures (the importance of literacy resources having appropriate script is highlighted). After several 'yummy' items, she says "we'd better have something healthy on this list" and adds apples. At the end of the session, she shows her Mum her new list. Lucy is delighted and tells her that's the best writing she's ever done. I photocopy the list for them and her profile.

Appendix 11

Samples of curriculum planning and evaluation

Oaktree Kindergarten

Name:

Date: 10 July 2001

Strand: Exploration

Goal: 4

Children experience an environment where they are developing working theories for making sense of the natural, social, physical, and material worlds.

Learning Objective: For   to extend and build on his knowledge and working theories about the living world, in particular sea life, through an excursion to Kelly Taritons and related curriculum experiences, on a regular basis.

Strategies:

     to help with planning of the excursion – writing newsletters, posters etc. (pre-literacy skills)

Create a sea wall with childrens sea creations in collage and art activities

Resource books / posters etc

Involve   in his learning objective fully

03/8/01 Evaluation: ___ has increased his knowledge base and can differentiate many types of sharks, types of penguins, reproduction of sharks + penguins.

___ has further developed his research skills through finding out different information through different sources.

The most useful strategy was to involve ___ in his learning objective

8/01 Learning Outcome: The trip to Kelly Tarltons along with group discussions and making a sea wall sparked an interest for other children in the group. ___ was able to share his knowledge with the other children.

There has been a strong link between the Kindergarten and home which has greatly enhanced ___ learning.

Parent Comments: ___ has a great interest in finding out factual information. To satisfy his thirst for knowledge he has to have detailed information e.g not just a shark it has to be a Hammerhead shark, a great white shark, a tiger shark etc.

Parent Signature:

Teacher Signature: ___

Date: 23 · 7 · 01

Oaktree Kindergarten Programme Plan

Date: July 10, 2001

Strand: Exploration

Goal: Children experience an environment where they develop working theories for making sense of the natural, social, physical, and material worlds.

Strategies:

An excursion to Kelly Tarltons will be planned.

Children will create a wall with their creations, collage and art activities of sea creatures and animals.

Resource books and puzzles will be available.

Evaluation:

Excursion has been planned and a date set 17 August 2001.
    is arranging this as per registration.
Walls have been developed - children enjoyed discussing
and researching what creatures they wanted to create.
Books and puzzles have been available - we will resource
videos to use also during session)

Learning Outcome:

Children are all aware of the excursion and some
have a greater understanding of different creatures.
Peer tutoring - children bringing resources from home.

Oaktree Kindergarten Programme Plan

Date: July 10, 2001

Strand: Exploration

Goal: Children experience an environment where they learn strategies for active exploration, thinking, and reasoning.

Strategies:

Activities that need to be solved will be available. E.g. computor puzzles, science experiments, extention on circuit boards.

Science resource books will be available.

Evaluation:

Circuit boards have been out and children have begun peer tutoring.

Computer has not been working.

Cooking experiments → popcorn
Floating and sinking experiments

Learning Outcome:

Children have developed an understanding of where to resource information eg resource books, computers. And have been involved in experiences that promote the learning objective.

Oaktree Kindergarten
Program Plan – August 6th – August 24th, 2001.

Strand: Exploration

Goal: 4 – Children experience an environment where they develop working theories for making sense of the natural, social, physical, and material worlds.

Learning Objective: For children to have the opportunity during each session to explore how things move and can be moved and access to technology to help explore movement.

For children to develop their skills, especially during small group work, in setting problems, hypothesysing and testing theories.

Evaluation:

Children have explored pulleys in the sandpit – moving sand, making flying fox.

Experiments with moving heavy items – eg concrete brick – using ramps / pulleys – lots of language / problem solving.

Discussion about weight in relation to movement.

Learning Outcome:

Children are developing their skills in hypothesysing and testing theories and working together as a group to find solutions.

Oaktree Kindergarten
Program Plan – August 6th – August 24th, 2001.

Strand: Communication

Goal: 4 – Children experience an environment where they discover and develop different ways to be creative and expressive.

Learning Objective: For children to experience a wide variety of the materials and technology that are used in the creative and expressive arts and for these creative events and activities to continue over several days and at times in group activities.

For children to make their own props for dramatic play and for teachers to provide a range of resources that will extend children's learning and experiences.

Strategies: To introduce different materials and technology during small group times. E.g. clay, drama props, cassette recorder, computer, musical instruments, carpentry tools, art extension activities, magnetic stories, puppets, familiar stories to be read, blocks, animals, miniature dolls.

Evaluation:

Art extension over several days.
Puppets / Magnetic's → lots of opportunities
Clay experiences

Learning Outcome:

Children have been given the opportunity to explore many different art activities and creative/expressive experiences.

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Oaktree Kindergarten
Program Plan – August 6th – August 24th, 2001.

Strand: Belonging

Goal: 2 – Children and their families experience an environment where they know that they have a place.

Learning Outcome: Over the next three weeks for children to play a more active part in the running of the programme.

Strategies: Ask children what they would like to do in their small group times.
Encourage children to bring things for show and tell.

Evaluation:

Show and tell - children have brought things from home to show and share with other children.

Children have developed lists of what they would like to do during small group times.

Learning Outcome:

Children have developed their skills in speaking in front of a group of children and are taking responsibility for the planning of group times.

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Appendix 12

Samples of coded transcripts

Key to coding: (sck) – subject content knowledge,(pk) – knowledge of pedagogy and philosophy, (kl) – knowledge of learners, (kc)- knowledge of context.

Parents focus group one:

What do you think is the value of trips for kindergartens then? What are the children learning from going on a trip?
Sue - Going on a bus. That is just a big thing. (kl)
Yes there's one boy who thinks it's his idea to go on the bus!
Lucy - It is a real community view isn't it. Like when we're all out there together, we're Oaktree Kindergarten (kc – sociocultural context), apart from what they see and learn in the actual place.
So what they see and learn.
Sue - A huge adventure.
So what do you think their expectations are of this particular trip? What have they been talking about at home?
? - Sharks.
Meg -Giant stingrays. (sck) Penguin 3 heard on the radio the other day, they were advertising Kelly Tarlton's. She was quite excited about that. She picked up on that.
Lucy - Penguins. (sck)
Penguins, yes we're right into penguins.
Meg - Yeah, and I told her we were going on a bus, and that really surprised her, she had no idea that we were going on a bus.
Anything else that they have been talking about? I know there has been great excitement here, I'm just curious to find out if there has been some excitement at home.
Meg - I get asked everyday, is it today?
What kind of learning do you think might happen on this trip?
Eve – Oh they'll learn about all the different sea creatures, (sck)
Cara - where they live and what they eat. (sck)
Rose - And I think also, they experience something what they have learnt through the books, but actually seeing is more deeply entering their mind, so they will sort of get more interesting to that sort of things, and they asking more questions. (pk)
Right. Well I'm hoping that they are going to ask lots of questions because notebooks are coming up!
Meg - A good experience though isn't it, Kelly Tarlton's, because there is nowhere else really you can go and see the size of things, and sea creatures, (sck) and when you read something in a book. They have no idea of the scale of it, until they see the real thing. (sck, pk)
That's right. Because they've been telling me, the whale shark is the biggest fish in the world. I'm not sure that there is one of those at Kelly Tarlton's actually….. But there are all these other different kinds of sharks that they are going to be looking out for and we've already got into the wobbegong now. Penguin 1 knew the word camouflage.
Sue - Did she?
Yes.

Sue -Oh, OK.

So she talked about that. Unfortunately she wouldn't come out with it on the tape, she told me that the other day (Tape stopped here).

(What kinds of knowledge do you think parents) And teachers will need to have on this trip. What do you need to know to be able to come along with these children?

Cara - At least to know what the fish are called. (sck)

How are you going to find that out?

Cara – from the Internet or information. (pk)

Eve - Just read it out to them, while you are standing by one of the fish tanks, you just read out to your children, this is a sea horse, (pk) blah, blah, blah you know, and they can.

Lucy - Last time we went to the library and got out books before and after, so we just looked at them before, and then followed it up afterwards. (pk) She had a fascination for weeks. (kl)

Yeah, and there is some of those things happening at the moment.

Eve - We took Bunny two years ago, she wasn't interested really. All she was interested in was the escalators, going round and around and around. (kl)

She told us this morning that she said she couldn't see anything, so I said that perhaps you could stand on a box this time.

Eve – I don't know if she even remembers half of it. She liked the Antarctic thing, going in the cars. She was too young you know. (kl)

Those that have been there, mentioned about going in the snow, and but one of the classic comments that isn't on tape is from Orca who said that he'd been there once when he was three, but this time he would see a lot more because he is four.

Jo- And in actual fact, he probably was not even three – oh he might have been nearly.

Right, just that whole idea of being more grown up and noticing more.

Jo - But then we've talked about that. (pk)

Oh right, as well yeah. OK. What kinds of knowledge do you think the teachers need to have?

Lucy- The ability to answer 20 questions at once. (pk)

Right, they have to answer 20 questions at once.

Sue - Being an encyclopaedia almost. (sck)

Teachers focus group one

OK, well what kinds of knowledge do you think teachers need to have to support children's learning? We've talked about a whole range of learning and communicating it to parents, what sort of knowledge base do you need to have as teachers?

Kate – a very broad knowledge base. (sck)

Mary - very broad. (sck)

Tell me all the things that are going to be in that broad knowledge base.

Kate - You need to have the skills (pk) and knowledge (sck) and to be able to access information if you need it (pk). More specialised information. I think we need to have a good general knowledge as well. (sck) I think we need to have, I mean if you look at all the strands in *Te Whāriki*, we need to have all of those, we need to have the communication skills that we can transfer on to children, we

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need to have exploration skills, (pk) and. I think you need to have the passion too to be able to do that as well with your knowledge. (pk)

Shaina - Can you ask the question again?

Just what kind of knowledge do teachers need to have to support children's learning?

Mary - I think you need to have that knowledge of how children learn best. (kl) You know as we said you know, working from an interest, or a.

Shaina - You need to articulate things in a way that they can understand. Like a lot of people talk above children, rather than at their level, and I think that's really important that you don't go talk about things beyond what they understand. And sometimes that can be really tricky, instead of trying to put it in a way, like with floating and sinking that I found. Trying to articulate that in a way that is relevant to them, and that they can understand, it is actually really hard. (pk)

Kate – And I think we don't have to have all the knowledge. We can show children that we need to find things out too, and that learning with them comes back to their partnership, and let's find out together. (pk, kl)

So what knowledge do you need to have, and what kind of knowledge is it OK to go and access?

Kate - I think the more specialised information. And a lot of the time too, you might have the knowledge, but you want the child to discover it so you actually, yeah, you say, well let's find out together. (pk) I think you need to have a good broad science knowledge, maths knowledge, how the world works, nature and the earth. (sck)

Shaina – and knowledge of how children learn as well. (kl)

Kate – mmm, yep.

And where do you get that from? Did you get that in your teacher education?

Kate - Um, I think from life, really and from early education, like from primary and secondary school.

Does the most recent graduate want to make a comment about that?

Shaina - I wonder, I'm trying to figure out where you're coming from.

Mary - I just found at college, a lot of it was very, almost too broad. I think a lot of things that we did, was just like a smatter. So in some ways I feel like I came out with knowledge, I mean obviously, but not so much specific knowledge. You know what I mean?

What did you want more of?

Mary - Well, I don't know how they would have done it, but just a bit more about, you know like, like say for instance, with music, or dance, I mean I don't, all those, it was just like a smatter, it just felt like it was just a little bit, little bit here, little bit there, little bit there, I guess that's the only way it could have been done. I mean, I think in terms of how people learn and all that sort of thing, that was fine. But, for specific subjects, I suppose if you are looking at it like that, specific subjects, if you look at the curriculum, you know, the maths and the science and your this and your that, you know, you get one semester of each. Sometimes two. Yeah, but that type of knowledge, I think I've probably felt a little bit unprepared.

Children's interviews after the excursion
- (excerpts from interview with Orca)
... Or was there something else that was your favourite?

That funny wobbegong shark and the puppet show.

The funny wobbegong shark.

The wobbegong shark. The wobbegong shark (singing song from puppet show).

That was good, wasn't it? Because you had gone to Kelly Tarlton's especially to find the wobbegong shark hadn't you, so it was really exciting that you saw it in the puppet show.

It was my idea.

What was your idea?

To go to Kelly Tarlton's. (kl/kc)

Oh, why was it your idea to go to Kelly Tarlton's?

To show everyone what, what we could see there.

...

That part's the best part, was when the orca whale came up.

What did it have in its mouth?

Um, a tiger seal. (sck)

A tiger seal, I should have expected you'd know exactly which type of seal it was, shouldn't I? Do you remember what Penguin 1 said that she felt like in this photo? What did she feel like?

Scared. (kl)

Were you scared going through the snow storm?

No. I thought the cat was turning over.

You thought the snow cat was turning over?

Yeah.

Because that's what it felt like?

Yeap. Whee ooh bonk! I thought my head would touch the roof.

You thought your head was going to touch the roof. It was going round and round wasn't it. I closed my eyes.

Why?

So that I couldn't see it going round. Did you think of doing that?

No. I went under the chair.

You went under the chair, so that you couldn't see?

Mmm

...

Do you remember what kind of penguins we saw?

King. (sck)

King penguins. And there was something else that was there as well. What did the penguins have? (pause) The brown fluffy ones.

Um. Babies.

That's right. They had some baby penguins there didn't they. The brown fluffy ones.

The baby ones were fat!

They were weren't they? They were nearly as big as the adults.

Yep!

...

Did you find out who Kelly Tarlton was?

Yep.

Who is he?

Um, well, he, he dived, he went under water looking for treasures, and I went to a ship museum and that's where, and that's what, and that's where the treasures Kelly Tarlton got. And um, he, he, decided to make Kelly Tarlton Underwater

World, so um, adults who can't dive and children who can't swim see what's under water. (sck)

Oh, right. And how did you learn that?

Mum told it to me. (pk)

Oh, Mum told it to you. How did Mum know that?

Jo - I read it, (pk) didn't I?

Yeah!! I was looking forward to the snow storm. Mum you didn't think there was penguins there, but there was.

Jo - Yeah, I knew there were penguins there. What kind of penguins were they? Can you remember?

King.

Jo - Were they King penguins? I thought they were going to be Emperor Penguins quite honestly.

What's the difference between the King Penguins and the Emperor Penguins Orca?

Emperor are bigger and the Kings are smaller. (pk)

Um, that's right. We figured that out eventually didn't we? Do you remember what the other questions were that you had before you went to Kelly Tarlton's? The things that you wanted to know about?

No.

If I remind you of some of them, can you tell me if you found them out? You wanted to know about where do the penguins come from? Where do they come from?

Um. Antarctica. (sck)

Antarctica, that's right. And you wanted to know what do whales eat? Did you find out what whales eat?

Um, yeap. I went on the computer (pk) and they eat salmon and seals (sck).

And what about sharks? How sharks make baby sharks.

From eggs…. And some get them out of their tummy (sck) (noises and demonstrations).

We saw a funny picture in a book of a shark with some eggs in a strange place. Do you remember what that was? Where the eggs were.

No. A mermaid's purse! (sck)

That's right! You remember about the mermaid's purse. You have remembered lots of things haven't you? Goodness gracious.

I remember everythink! (kl)

Appendix 13

Draft summary of findings sent to participants

Subject content knowledge – factual and conceptual knowledge; general knowledge

Teachers' beliefs	Parents' beliefs	Children's beliefs and knowledge
"I think there needs to be that understanding of … the basic elements of … subjects" "But we couldn't have (specific subject knowledge about everything could we?" "A broad science knowledge, maths knowledge, how the world works, nature and the earth" "I feel more confident in some areas than others" "Content knowledge comes from 'life' and 'education'"	"Mums or teachers don't have to know everything" "Be an encyclopaedia almost" "Have just a reasonable general knowledge"	Tooth fairy Penguin 2 "… they make it into magic for tooth fairy land". Helen "Has the tooth fairy visited you?" P2 "No, you have to have a fallen out tooth for that to happen". Helen "When does this happen?" P2 "When you are 6. My friend (name) has wiggly teeth now because she got hers earlier then me. The tooth fairy has lots of teeth in fairy land. But she won't give me one because they are old teeth". Helen "What happens when your tooth falls out?" P2 "The tooth fairy comes, or is it just your Mum and Dad?" Helen "I'm not sure. How do you get another tooth?" P2 "It just grows back, but it is bigger". Baby bathing I ask them what they need to give their babies a bath. They tell me new clothes, a towel, soap and warm water - not too hot. P1 tells me you have to be careful not to get soap in the baby's eyes, you need to make sure the baby keeps warm, you must hold the baby safely and not leave them alone in the bath. … She asks me to look after her baby so she can play in the sandpit without her baby getting sandy again. I say that I will and it is responsible of her to leave her baby with someone. P1 "Yes, you don't leave babies on their own".

Subject content knowledge – factual and conceptual knowledge;
specialised knowledge

Teachers' beliefs	Parents' beliefs	Children's beliefs and knowledge
Prior to excursion:		
"You can't go somewhere and not have any idea about where you're going and … what's going to be there"	"If you want (children) to get the full benefit (of a) trip, … some preparation (is required)"	Species of sea creatures: Orca could name and describe six species of sharks (whale, tiger, grey nurse, great white, thresher, hammerhead) five types of whales (orca, hump, finback, blue and sperm). He named eight other sea creatures he expected to see at Kelly Tarlton's (moray eels, jellyfish, octopus, crabs, stingray, lion fish, kingfish and puffer fish).
		"To know about what we're seeing"
		The wobbegong is camouflaged – "It's the same colour as the rocks"
Following excursion:		
"Children were more aware of what was what (species of sea creatures) … that really descriptive language came out"	"He was buzzed about seeing the wobbegong swimming and then he found a fish called the leather jacket"	"The whale shark isn't a whale, it is just a shark"
		Knowledge of reproduction habits of sea creatures – eggs, mermaid's purse, nests, "in their tummies"
	classification of king and emperor penguins	"They were king penguins"
classification of king and emperor penguins	"She wanted to know what kryll look like … and the king chicks being brown … how the feathers changed over"	"(Fish breathe) through their gills. … (penguins) come up for a little breath (and can stay under) for a very long time"
knowledge of species of shark		turtle: "hard at the bottom" "it feeled like concrete"
"It's been a learning thing for me too"		
"It has made me quite self-reflective about what I'm doing … curriculum content am I putting out there… in a good way"		starfish: "it had bumps under it"
		mechanical orca whale: "there's a spring what pops up" "the whale came up when the switch came on"
		"I make a real Kelly Tarlton's at home"
differences noted in detail of children's drawings – pre-excursion and post-excursion		"What if (the water) blasted right out (of the shark tunnel)?"
		"He decided to make a Kelly Tarlton's Underwater World so adults who can't dive and children who can't swim (can) see what's under water"

Knowledge of pedagogy and philosophy – effective learning and teaching processes in planned and spontaneous interactions

Teachers' beliefs	Parents' beliefs	Children's beliefs
"You need to articulate things in a way they can understand. … how can I say that to these children so they can actually understand?" "A lot of what we do isn't obvious" "We have to spell it out for them (parents)" "I think that is what has happened in early childhood education, no one has really known why we are doing things" "You can teach a variety of things through a variety of different activities" "teaching through facilitating" specialised knowledge is able to be researched "guide them, or (ask) them to think about" "It's okay to explore those different concepts … just explore that thinking that's happening, not just us being the knowledgeable ones that say, that's the way it is …" "We can show children that we need to find things out too. … let's find out together"	"You kind of limit their learning by relating to them as pre-schoolers… . They can actually take in a lot more factual information than (we) give them credit for" "a lot of the gross motor or playing here is actually vital to strengthening and getting ready for writing…" "he learns from playing … physics… volume… with their water play and filling up containers of sand" "maybe I haven't realised the importance of play … I didn't realise that it had that much of an impact" "when they are playing, if they learn something, it's serendipity" "guide them, or (ask) them to think about" "If the children do ask questions that (teachers) might not know the answers to, that they can say that (they don't know) and then find out together with the child. Because helping them find out information … is another thing that is going to be quite important for them in later life" "they get fed up with us trying to teach them" "When he comes out with a piece of information (I) … take it and run with it and … we discuss lots of things" "She's busy helping other children write apparently, which made her feel important"	Re teachers "You're going to have to look after your kids very goodly and make sure they don't go out the gate" Re parents "Mum told me" "well my mum said" Penguin 2 "Why did Orca's Mum say there were only Emperor penguins at Kelly Tarlton's? My picture from Kelly Tarlton's is of King penguins". Helen "I don't know. We will find out tomorrow". Re peers "Shall we ask Orca why?" Siblings as sources of information "(Penguin 1) was talking to Chris (six-year-old brother) about Kelly Tarlton's, and they came out with Chris's first encyclopaedia, and she found all the things that she thought she might see there, and asked him to read about, you know, a little bit about the penguins and the sharks and things like that."

Knowledge of learners – individual interests, capabilities and learning preferences

Teachers' beliefs	Parents' beliefs	Children's beliefs
"find out what their interests are and what their strengths are … what they're capable of and not so capable of" "in that partnership together we are learning together" (teachers and children) "I see it very much as a partnership between the children and us and the parents. … I think it is something that we all work together at"	"They've done a really good observation on how she learns… . (The teachers) have been really good… at observing then steering and guiding and picking up on children's learning styles" "the teachers here have been very good at recognising the individual differences in the children and nurturing that. Sort of encouraging them in the areas that are obviously their strengths or (where) their interests lie, or trying to use their interests to build … skills that they are going to need." "you can tell they've been listening to Penguin 1, because it's how she talks. you can …visualise what's been going on." "to use their interests"	"they need to know the kids" emotional safety and security as a precondition to learning and exploration "don't let the kids run away from you" "make sure they don't go out the gate" "It was my idea to go to Kelly Tarlton's"

Knowledge of context – setting, organisational systems and culture, planning and evaluation tools, knowledge of families and community

Teachers' beliefs	Parents' beliefs	Children's beliefs
portfolios		
"Nothing goes into the profile that's not written about" "… When we have set the goal we show the parents and involve them in the process and talk about … what we are going to be doing and working on and if they can input in any way, and explain how it fits into the curriculum …"	"Since the new teachers have started, I think they've been brilliant with the portfolios" "They seem to have a really good grasp of the curriculum … they relate the portfolios to that really nicely"	"Do you want to put this picture in?" "Can you give this to Shaina for my profile?"
group size		
"I don't think ratios are the biggest issue, I think it is the number of children" "It is a difficulty for a whole lot of reasons" "… to follow up on an interest or something, it is really hard to be involved for any length of time" "… because of the numbers there's more chances that you are going to be interrupted or disrupted from that group work"	"They've only just started, those small group times, and it has just been fantastic, because you actually hear what happens at kindy now. Penguin 1 will go "Oh did I tell you what we did at kindy?" whereas before – nothing" "I had no time playing with Bunny. I didn't have time, just too busy cutting up fruit and cleaning up the mess." "…the teachers need the support, I mean they can't do everything" "(Then) you can play with the children, instead of cutting up apples and tidying up all morning. That's what I felt like. When I actually did parent help all morning."	"Ooops, I'm not allowed in there with this" (sand pancakes into library) Kate asks the children "Do we throw balls over the fence at kindy? Do we climb the fence at kindy?" Chorus "no". "What might happen?" Starfish "There's a road there and you might get run over" Child "You might land on your head and have to go to hospital" Penguin 1 "You might get lost". Kate "What should you do if a ball goes over the fence?" Child "Tell a teacher" Kate "Yes, quickly. What should you do if you see someone climb a fence?" Chorus "Tell a teacher". Kate "We need to keep safe at kindy." Helen -Tell me what happens if you have a special idea about something you'd like to do at kindergarten. Are you able to do it? Penguin 1 – yes

kindergarten/junior primary

"… it's more structured learning following a curriculum, as opposed to following actual interests of children. … I feel there shouldn't be a difference between early childhood and primary teachers. I think they should have a better understanding of child development maybe, and what is actually happening."

"To me, I don't know who is doing the disservice, but I sometimes feel as though there is … such a jump and I just think it must be very confusing sometimes for children to go into that and it's just so different"

"… so they are looking at certain topics and information about it. But it is not necessarily coming from the children. And I think that is the difference between here and there, is that they are constantly getting … a topic of interest that they are looking at and it is changing all the time"

"It's the emphasis, I mean here it is 90% play, 10% mat time. At school it is the opposite way around. … It is more structured learning."

"It must be a real adjustment for some kids, into the classroom. … Because of the free play down to the structure, and some of the kids just don't learn like that…. It's sort of sit down, be quiet and get on with it. Not totally, but comparatively. I think the curriculum at a kindergarten is much more open, and they can let children explore in their own way. Whereas a primary school teacher, I mean she's got to teach them to read, and she's got to teach them to write"

"… our kindy teachers in particular being very good at finding children's strengths, and running with that, as far as then teaching them some of the skills that they're not quite so good at by using their interest. Whereas really at school they don't do that at all."

Penguin 1 – You need to do writing at school and go on more mat-times more than three mat-times
…You have to sit in a circle … a circle always
Helen – … So can you already do writing at kindy?
Penguin 1 nods
…
Helen – So what's going to be different at school to kindy do you think?
Penguin 1 – I told you writing, I told you mat-times
Helen – But that sounds like the same as kindy to me
Penguin 1 – It isn't because you need to sit at tables sometimes
Helen –Why do you sit at tables?
Penguin 1 – Cos you need to sit at tables when you do writing
Helen – … What else do you do at the tables?
Penguin 1- You gotta do maths.

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