Changing Learning Conversations: An Action Research Model of Reflective Professional Development

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ABSTRACT

A growing body of international research has indicated that teacher effectiveness is the most important factor affecting student achievement. At the heart of effective teaching and learning are learning conversations, in which teachers play a pivotal role in mediating learning by orchestrating discussion with students. This action research study had a dual purpose, firstly to investigate the effects of teachers' knowledge and thinking on their ability to mediate students' learning in classroom learning conversations, and secondly to provide the participating teachers with opportunities to investigate and develop their professional knowledge and practice. The action research approach allowed the collection of substantive information about teachers' thinking and practice, while at the same informing and developing that practice through cycles of data collection, analysis, and reflection. The study involved two New Zealand primary school teachers in four cycles of action research. Information was gathered about the teachers' knowledge, thinking, and practice through semi-structured interviews, classroom observations, and reflective journals. Observation transcripts were analysed, coded, discussed, and reflected upon during reflection days at the end of each cycle.

The initial findings of the study revealed that although the two teachers were very different in their teaching styles, there were strong similarities in the fragmented nature of their knowledge of learning and assessment theory. Discrepancies were found between the teachers' espoused theories and their theories-in-use. In addition, the teachers' practice was strongly influenced by implicit beliefs and routinised behaviours, which had a powerful and often detrimental effect on the quality of their interactions with students. However, the process of examining the evidence in their own lesson transcripts enabled the teachers to develop awareness of weaknesses in their practice. This was a catalyst for reflection that resulted in change and improvement. After an initial regression both teachers made small but incremental changes in their interactions with students. By the end of the final cycle both teachers had appreciably improved the quality of their classroom learning conversations. The study demonstrates the effectiveness of classroom-based action research as a model for reflective professional development.

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CHAPTER ONE

INTRODUCTION

> ***How teachers learn and develop as professionals is a question that has compelled teacher educators and researchers for many years. How do teachers learn to draw upon and use their understanding of subject matter, learning, development, culture, language, pedagogy, and assessment in addressing concrete problems of practice? How do they learn to manage the individual needs of diverse learners with the demands of the curriculum and the goals of the larger group? (Hammerness, Darling-Hammond, & Bransford, 2005, p. 358).***

There is a growing body of international research that indicates that teacher knowledge, thinking, and skill are among the most important factors affecting student achievement. Recent studies have found that teacher effectiveness has a much stronger influence on learning than any other factor, including class size and composition, and family and peer influences (Alton-Lee, 2003; Bransford, Darling-Hammond, & LePage, 2005; Calderhead & Shorrocks, 1997; Darling-Hammond, 2000a, 2000b; Hattie, 2002; Shulman & Shulman, 2004; Turner-Bisset, 1999, 2001). According to Bransford, Darling-Hammond, and LePage (2005):

> Students who are assigned to several highly effective teachers in a row have significantly greater gains in achievement than those who are assigned to less effective teachers; furthermore the influence of each teacher has effects that spill over into later years (p. 13).

While it may appear simple to the uninitiated, effective teaching is a complex activity, involving the coordinated use of a diverse range of knowledge and skills (Bransford, Darling-Hammond, & LePage, 2005). As indicated by the questions (above) raised by Hammerness, Darling-Hammond, and Bransford (2005), just how teachers learn and develop the requisite knowledge and skills for professional competence is the subject of ongoing investigation and debate. However, many outside the profession believe that it is a simple matter: they know how to teach and what is important about schooling because they were once students themselves (Darling-Hammond, Banks, Zumwalt, Gomez, Sherin, Griesdorn, & Finn, 2005). Internationally, over the past two

decades in particular, politicians, the media (e.g., Cumming, 2004), and members of the general public, have cast doubt upon the quality of education, often in relation to perceived "crises" or declining standards (Darling-Hammond, Pacheco, Michelli, LePage, & Hammerness, 2005). The knowledge and skill of teachers, along with the quality of teaching and learning in their classrooms, are frequently questioned, and doubts are often expressed about the quality and value of teacher education (Bullough, 2001; Cochran-Smith & Fries, 2001; Darling-Hammond, Pacheco, Michelli, LePage, & Hammerness, 2005).

In many countries, New Zealand included, the comparatively low status of the teaching profession has led to difficulty with recruiting the most academically able students into pre-service teacher education programmes (Bullough, 2001). During the last decade pre-service teacher education providers in New Zealand, due to changes in government funding policy, have been forced to truncate their teacher preparation programmes. Primary teacher education in New Zealand at present follows two major tracks, a one-year graduate diploma, and a three-year undergraduate applied teaching degree. Both present difficulties related to developing the professional knowledge base of student teachers. While the one-year graduate programmes often recruit more academically able students who already have in-depth subject content knowledge associated with a university degree in an academic discipline, their very brief teacher education programmes provide them with, at best, a minimal coverage of human development, learning theory, pedagogy, assessment, and curriculum. In contrast the three-year undergraduate degree programmes, while providing more (if barely adequate) coverage in these areas, recruit both school leavers and mature students who lack a broader general education to graduate level and consequently may have associated difficulties with subject content knowledge.

During the past twelve years my role as a teacher educator has taken me into a large number of New Zealand primary school classrooms and enabled me to observe many teachers and student teachers working with children. Although on a number of occasions I have been privileged to observe exemplary teaching practice, many of the "lessons" that I have observed have been more concerned with pastoral matters, with managing student behaviour, with issuing basic instructions, and with the completion of menial tasks, than with quality teaching and deep learning. Discussions with my

colleagues have revealed that they have had similar experiences. This has led to a growing concern regarding the quality of the learning opportunities being presented to students in some New Zealand classrooms.

This concern gives rise to a number of questions about education in New Zealand. Just how skilled *are* our teachers? How effective is their practice? Are they equipped with a comprehensive knowledge base? How do they conceptualise their professional knowledge? How do they use their knowledge and skills in their interactions with their students? How do practicing teachers refine and develop their practice?

1.1 Focus of the study

At the heart of teaching and learning are the "learning conversations" in which teachers mediate learning by orchestrating discussion with their students. From a contemporary viewpoint, learning is considered to be a social activity. Interactions between teachers and students, using language as a mediating tool, are seen to play a crucial part in the process (Dufficy, 2005; James 2006; Vygotsky, 1978). Learning conversations are pivotal in providing opportunities to develop students' understanding. In such conversations effective teachers focus students' attention, interpret, organise, and structure ideas and problems to make them more easily understood, and challenge and extend students' thinking (Dufficy, 2005).

The ability to effectively mediate learning is contingent upon the teacher's professional knowledge base; that is, the blend of content, curriculum, and pedagogical knowledge required to develop students' understanding (Bransford, Darling-Hammond, & LePage, 2005; Shulman & Shulman, 2004; Turner-Bisset, 2001; Wilson, Shulman, & Richert, 1987). Hattie (2002) claims that "expert" teachers differ from others in the degree of challenge that they present to students, and as a result their students "exhibit an understanding of the concepts targeted in instruction that is more integrated, more coherent, and at a higher level of abstraction than the understanding achieved by other students" (p. 15).

In effective learning conversations, teachers ask searching questions to assess students' current understandings and to challenge and extend their thinking (Black, Harrison, Lee, Marshall, & Wiliam, 2002, 2003; Black & Wiliam 2006a, 2006b). They also provide appropriate feedback to correct misunderstandings and to offer alternative points of view (Black, Harrison, Lee, Marshall, & Wiliam, 2002, 2003; Black & Wiliam 2006a, 2006b; Dufficy, 2005; Sadler, 1989, 1998; Tunstall & Gipps, 1996). The ability to do this requires a broad and complex knowledge and skill base, including a deep understanding of the subject matter to be taught (Gregg, 2001; Sanders & Morris, 2000; Soares & Prestage, 2000; Shulman & Shulman, 2004; Turner-Bisset, 1999). Also essential is an understanding of how students learn (Airasian & Walsh, 1997; Bransford, Brown, & Cocking, 1999; Bransford, Darling-Hammond, & LePage, 2005; Bransford, Derry, Berliner, & Hammerness, 2005; Bullough, 2001; James, 2006; Hammerness, Darling-Hammond, & Bransford, 2005). The ability to be metacognitive or reflective about teaching in order to monitor and perceive weaknesses in practice is also critical (Eraut, 1994, 2000; Shulman & Shulman, 2004; Turner-Bisset, 2001; Yero, 2002).

This study focuses on the effects of two New Zealand primary school teachers' knowledge, thinking, and beliefs on their ability to effectively mediate learning, by closely examining the quality of their interactions with students during classroom learning conversations.

1.2 Significance of the topic

While there has been a great deal of international research published on the relationships between teachers' knowledge, beliefs, thinking, and practice (e.g., Calderhead, 1996; Carlgren, Handal, & Vaage, 1994; Day, Calderhead, & Denicolo, 1993; Shulman, & Shulman, 2004; Turner-Bisset, 1999; Wilson, Shulman, & Richert, 1987), very little has been conducted in New Zealand primary school settings. Several studies have provided information about secondary teachers' subject and pedagogical content knowledge (e.g., Gregg, 2001; Sanders & Morris, 2000; Soares & Prestage, 2000). However the comprehensiveness of the subject content

knowledge of New Zealand primary school teachers, who are required to cover all curriculum areas, has not been investigated.

A number of researchers have investigated learning conversations between teachers and students (e.g., Cazden, 2001; Dufficy, 2005; Latham, 1997; Mercer, 1995; Pressley & McCormick, 1995; Torrance & Pryor 1998; Young, 1992), although there has been little in-depth research on the subject in New Zealand classrooms. Previous research has provided information on questioning (e.g., Black, Harrison, Lee, Marshall, & Wiliam, 2002, 2003), and feedback (e.g., Knight, 2003; Sadler, 1989, 1998; Tunstall & Gipps, 1996) in primary schools, but the effects of teachers' knowledge, thinking, and beliefs on such interactions have not been examined.

In 2001 a report by McGee and Penlington established that there had been little research on teacher knowledge, beliefs, and thinking carried out in New Zealand. The report concluded that a number of topics needed to be explored, including teachers' mental and written planning, the relationship between what teachers say they do and what they actually do, how teachers engage in reflection and the effect this has on their practice, the ways in which teachers change their knowledge and beliefs, and how such changes influence their subsequent classroom practice. The present study may prove to be timely, in that it investigates aspects of all of these topics in a New Zealand context.

1.3 The case for action research

I approached the present study with a dual purpose. Firstly, I wanted to investigate the effects of the participating teachers' knowledge, thinking, and beliefs on their ability to effectively mediate students' learning in classroom learning conversations. My second intention was to empower the teachers by providing them with opportunities to investigate, reflect upon, develop, and change their own professional knowledge and practice. The dual purpose of the study required a research design that was flexible enough to allow the collection of substantive information about teacher knowledge, thinking, and practice, while at the same informing and

developing that practice through recursive cycles of data collection, analysis, and reflection. For this reason, action research was the logical choice of methodology. According to Somekh (2006) there is much to be gained by adopting the "dual approach" (p.27) of action research. Somekh claims that action research is a process in which the description, analysis, and theorisation of social practices can be combined with systematic intervention, allowing researchers to work in partnership with research participants to reconstruct their practice.

Shulman and Shulman (2004) believe that "reflection is the key to teacher learning and development" (p. 264). They claim that the ability to become conscious of and to critically reflect upon understandings, performances, and dispositions is crucial if teachers are to have the capacity to purposefully change and develop their own practice. According to Shulman and Shulman, teacher learning "proceeds most effectively if it is accompanied by metacognitive awareness and analysis of one's own learning processes, and is supported by membership in a learning community" (2004, p. 267).

Previous studies (e.g., Convery, 1998; Evans, Lomax, & Morgan, 2000; Salzman, Snodgrass, & Mastrobuono, 2002; Zorfass & Keefe Rivero, 2005) have found that the opportunities for meaningful discussion with colleagues that are provided by working in communities of practice can have a powerful impact on teachers' reflective capacity. Action research within a community of practice allows teachers to clarify their beliefs and understandings about their practice through the sharing of ideas. It allows teachers to work together to examine and discuss their intentions and actions in teaching, and through the deliberate and systematic study of their own classroom teaching, bring about change and improvement in their practice.

In this study I worked as an outside facilitator with two classroom teachers in a New Zealand primary school. We gradually developed a small community of practice, working together through four cycles of action research over a period of nearly two years. This enabled me to investigate, over an extended period, the effects of the two participating teachers' knowledge and thinking on their interactions with students in classroom learning conversations. At the same time I was able to feed back the research findings and discuss them with the teachers, thereby supporting them in

critiquing, reflecting upon, and developing their teaching practice.

1.4 Structure of the thesis

This thesis develops substantive information regarding the effects of the participating teachers' knowledge, thinking, and beliefs on the quality of their interactions with students in their classroom learning conversations. In keeping with the dual purpose of the study it also develops information about the action research process and its effectiveness as a model for in-service professional development.

The next chapter, Chapter Two, reviews the literature on teacher knowledge and thinking, classroom learning conversations, teacher reflection, and classroom-based models of professional development. Chapter Three examines theoretical aspects of action research methodology, while Chapter Four provides a brief outline of the practicalities of setting up this action research study and the ethical considerations involved in the research process.

The following four chapters (Chapters Five to Eight) present a detailed account of each of four cycles of action research. The substantive findings of the research are presented, along with commentary on the process that involved the participants in analysing, reflecting, and acting upon data concerning their own classroom teaching.

The final chapter, Chapter Nine, discusses the significance of the findings of the four cycles of action research with regard to the effects of the participating teachers' knowledge, thinking, and beliefs on the quality of their classroom learning conversations. The chapter also argues the merits of the present action research process as a model for classroom-based reflective professional development. The chapter concludes by examining the implications of the findings of this study for both pre-service and in-service teacher education.

CHAPTER TWO

LITERATURE REVIEW

> ***Teachers need opportunities to learn about children's cognitive development and children's development of thought (children's epistemologies) in order to know how teaching practices build on learners' prior knowledge (Bransford, Brown & Cocking, 2000, p. 242).***
>
> ***Good teachers understand what students everywhere can confirm: teaching is not just talking, and learning is not just listening (Horowitz, Darling-Hammond, & Bransford, 2005, p. 88).***

This chapter firstly provides an outline of the two theories of learning that underpin this thesis, constructivist and sociocultural theory. The components of a knowledge base for teaching are discussed, in particular subject content knowledge and pedagogical content knowledge. The realities of classroom learning conversations and the role of formative assessment in the mediation of learning are then examined. Reflective professional development is also considered in this chapter because of its effects on teacher knowledge, thinking, and beliefs, and its central role in the action research process.

2.1 Two theories of learning

Constructivist theory and sociocultural theory are particularly relevant to the present study. Constructivist theory is of interest because of the widespread impact that it has had on teachers' beliefs about students' learning. Aspects of sociocultural theory are of interest because they underpin this investigation into the ways in which teachers mediate students' learning in their classroom learning conversations. Sociocultural

theory is also associated with the development of communities of practice in the process of action research.

2.1.1 Constructivist theory

During the 1960s the ideas of Piaget became prominent in the field of human learning and development (Schunk, 2000). Piaget believed that internal or cognitive processes were involved in learning. According to Piaget, rather than simply being passive receptors of knowledge, learners interact with their physical and social environments to develop, or construct, their own unique understandings of the world (Gredler, 2001; Piaget, 1929). Because Piaget believed that learners individually construct their knowledge and understanding of the world through personal exploration, he is sometimes referred to as an individual (or personal) constructivist (Gredler, 2001; MacNaughton, 2004; Schunk, 2000).

Piaget's early research developed a framework of four stages of qualitative changes in the development of reasoning processes. These stages of cognitive development follow a fixed sequence, and are associated with approximate age ranges. According to Piaget, learning is dependent on the child having reached the required stage of cognitive development (Gredler, 2001; Schunk, 2000). This premise has led to the widespread practice of providing developmentally appropriate educational experiences for learners, based on their level of cognitive development and their accumulated prior knowledge.

The associated notion of "readiness" is widely held by teachers, particularly in relation to young children, as is the practice of observing and waiting for children to show interest or aptitude in a skill or topic (Goodman Turkanis, 2001; Schunk, 2000). McLachlan-Smith and St. George (2000), in an investigation into New Zealand kindergarten teachers' implicit theories of learning, found that the teachers in their study believed that children do not learn until they are "ready" (p 42). Some of the teachers spoke about observing and waiting for children to reach a "teachable moment" (p. 42) before attempting to teach new knowledge or skills.

Piaget's stages of cognitive development have been challenged on many grounds (Gredler, 2001; Schunk, 2000). Cognitive development has been found to be uneven across domains of learning, and children have been found to be able to grasp ideas and perform tasks earlier than Piaget believed possible (Byrnes, 1996; Horowitz, Darling-Hammond, & Bransford, 2005). New Zealand studies have found that the readiness model advantages students who bring school-related skills or knowledge to the learning process, and disadvantages diverse learners (Alton-Lee, 2003). Cross-cultural studies have shown that children in different cultures do not necessarily proceed through Piaget's stages at the same pace (Sutherland, 1992). Airasian and Walsh (1997) contend that Piagetian theory does not take into account factors such as the race, class, and gender of learners. Some experts reject the notion of stages altogether, and others, while acknowledging evidence of "stagelike" changes, believe that the concept should be applied more loosely than Piaget envisaged (Berk, 2006, p. 252). Higgins (1998), in a New Zealand investigation into the teaching of mathematics in the first two years of school, found that the teachers involved in the study believed that children learn when they are ready, and that it was not their role to move the children to the next step in the learning process. Higgins claims that the teachers' philosophical belief in readiness resulted in a non-productive model of student group work.

Piaget believed that cognitive development occurs naturally through interaction with the physical and social environments when triggered by "disequilibrium" or cognitive conflict. He used the term equilibration to refer to the biological drive to produce an optimal state of equilibrium between cognitive structures and the environment (Gredler, 2001; Piaget & Inhelder, 1969; Schunk, 2000). In other words, when faced with discrepancies between their understanding of the world and new information, learners go through the process of equilibration in order to revise their original thinking to provide a better fit with the new information (Rogoff, 1998b). According to Piaget (1979) knowledge is derived from acting upon and transforming information, and by adapting that information into structures of cognition, termed schema. Piaget believed that learners individually construct and reconstruct their schema through the process of equilibration. This involves either the assimilation of new information, when it fits with and augments existing schema, or the accommodation, or modification, of existing schema to fit with new information when

the two are not congruent (Piaget, 1929; Piaget, 1979; Piaget & Inhelder, 1969; Schunk, 2000). Although Piaget's theory focuses on the individual's internal processes, he did acknowledge the importance of social interaction in the learning process (Palincsar, 1998; Rogoff, 1998b). Piaget believed that social interaction triggers cognitive conflict by making the learner aware of alternative points of view, resulting in efforts to reestablish equilibrium (Rogoff, 1998b).

Piaget contended that cognitive development could not be taught, and that classrooms should be centres of activity, where learning can occur through action and social exchange (Gredler, 2001). His influence was far-reaching across the Western world, and to the present day his ideas continue to influence teachers, many of whom consider themselves to be facilitators of children's construction of knowledge, and who frown upon direct teaching, or "teaching by telling" (Sfard, 1998, p. 10), which is believed to stifle children's initiative. There is a widespread belief that children should be provided with rich learning environments organised around spontaneous research, in which they should be encouraged to actively explore, and to participate in symbolic or make-believe play (Gredler, 2001; Schunk, 2000). McLachlan-Smith and St. George (2000), in their study of New Zealand kindergarten teachers' beliefs, found that teachers believe that children learn through active "hands-on experience" (p. 44), that their role is to provide a "stimulating environment" (p. 44) with resources for children to engage in "free play" (p.44), and that they should "support and guide" rather than "direct and instruct" (p. 44).

Airasian and Walsh (1997) caution against the belief that responsibility for acquiring knowledge should be passed from the teacher to the student. They contend that although teachers need not be the sole suppliers of information, they should remain involved in the learning process in order to coordinate and critique student constructions and understandings. Constructivist theories play a major role in modern theories of learning and teaching. However, they are theories of learning, not theories of pedagogy (Hammerness, Darling-Hammond, & Bransford, 2005, p. 369). According to Bransford, Derry, Berliner, and Hammerness (2005):

> In particular, adopting a constructivist theory of knowing does not imply that all learning should be discovery oriented and that direct instruction should always be avoided … instead it implies that teachers must take account of students' prior conceptions in designing

> instruction, because these will influence what students learn - for good or ill - whether or not the teacher is aware of them. The concept of constructivism is frequently misunderstood (p. 53).

Learners construct their own knowledge and interpretations regardless of the method of instruction, and they are as likely to construct a variety of different meanings from direct instruction as from an activity-based approach (Airasian & Walsh, 1997; Bransford, Brown, & Cocking, 1999). However, there is a tendency for teachers to confuse the constructivist epistemology of learning with an instructional approach (Bransford, Derry, Berliner, & Hammerness, 2005; Bullough, 2001; Hammerness, Darling-Hammond, & Bransford, 2005). Anecdotal evidence from teacher educators in New Zealand suggests that many teachers and student teachers believe that teaching methods such as direct instruction no longer have value under any circumstances. This is an area that requires further investigation.

2.1.2 Sociocultural theory

There was a shift in thinking after the sociocultural theory of learning, developed by Vygotsky, was first published in English in 1978. This theory is a constructivist approach that emphasises the importance of the social environment in learning, and is sometimes referred to as social constructivism (although this term is also sometimes used to refer to a blend of constructivist and sociocultural theory). Vygotsky's theory was formulated on the belief that mental activity develops not within the consciousness of individuals, but from outside themselves, through social interaction and participation in shared cultural activities (Dufficy, 2005; Rogoff, 1998a). In Vygotsky's words (1978, p.57): "Every function in the child's cultural development appears twice; first on the social level, and later on the individual level; first *between* people *(interpsychological),* and then *inside* the child *(intrapsychological).*"

Rogoff (1998a) suggests examining learners' participation in shared cultural activities by applying lenses to what she terms the personal, interpersonal and community planes of activities. In the personal plane the learner is highlighted, although the interpersonal relationship and context remain in the background. In the interpersonal plane the analysis shifts from the individual to interactions, relationships, and collaboration. In the cultural plane the focus is on the mutual embeddedness of the

individual within the whole cultural or institutional context. Rogoff suggests that each of the planes making up a whole activity or event can be considered separately as foreground, without losing track of their inherent interdependence in the whole. In the present study, while all three planes of analysis are considered, there is particular interest in the interpersonal plane because the focus of the study is on teachers' interactions with students in their classroom learning conversations.

Vygotsky believed that individuals personalise knowledge gained from social interaction through a process of mental transformation, or internalisation. However, he provided little explanation of how this process takes place (Berk, 2006). An important mechanism involved in internalisation is internalised dialoguing, or inner speech. Vygotsky considered speech to be more than the expression of developed thought; he believed that thought is restructured as it is transformed into speech (Gredler, 2001; Schunk, 2000). Bakhtin (1981), a contemporary of Vygotsky, considered that the term internalisation connoted a unidirectional, passive process of acquisition, and preferred the term appropriation. Appropriation, according to Bakhtin, connotes a more active reciprocal process involving mental transformations. He believed that adults appropriate children's utterances and re-voice them in a more mature form in order to assist children to develop or appropriate their own knowledge systems. Classroom teachers frequently use this strategy in their learning conversations with students.

Vygotsky developed the notion that learning occurs through interaction between the learner and more knowledgeable others within the learner's "zone of proximal development" (ZPD), which he defined as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p.86).

Contrary to Piaget's view of development leading learning, Vygotsky contended that learning precedes and leads development. Vygotsky's notion of the ZPD contradicts the concept of readiness. Instead of waiting for the child to display readiness to learn, Vygotsky believed that the teacher's role is to provide experiences and instruction within the ZPD in order to promote learning. By definition, such learning experiences

should be both challenging and supportive of development, so that the tasks that learners can accomplish in collaboration with the teacher they can later accomplish alone (Dufficy, 2005; Gredler, 2001). Effective teaching within the zone of proximal development is dependent on the use of appropriate support practices. This requires the teacher to organise learning to build on prior knowledge, and to present critical ideas in meaningful ways. To do this, teachers need to have accurate knowledge of learners' starting points, or their current knowledge and understanding (Gredler, 2001; Long, 2000; Rogoff, 1990; Schunk, 2000).

Wood, Bruner, and Ross (1976) first used the metaphor of a carpenter's "scaffolding" to illustrate the nature of appropriate instructional support practices used within the ZPD. Scaffolding is a flexible, responsive process, in which the adult supplies initial support to enable learners to construct their understanding. The support is gradually withdrawn as the learner develops greater understanding or competence (Jordan, 2004; Long, 2000). Scaffolding takes a variety of forms. It may involve recruiting the child's interest in the task, motivating the child, and directing the activity to maintain pursuit of the goal. It may mean simplifying the task to make it more manageable, controlling frustration and risk in problem solving. It may also mean demonstrating an idealised version of the task to be performed, and highlighting discrepancies between what the child has produced and the ideal solution. By allowing the learner to accomplish tasks that are not possible without such support, scaffolding extends the range of tasks that the learner is able to perform (Wood, Bruner, & Ross, 1976).

New Zealand researchers have found that scaffolding enables students to not simply learn, but to internalise the independent learning strategies that are made transparent to them in the scaffolding process (Alton-Lee, 2003). Alton-Lee, in a synthesis of New Zealand research on teaching and learning (e.g., Alton-Lee & Nuthall, 1998; Hohepa, Hingaroa Smith, Tuhiwai Smith, & McNaughton, 1992; Vine, Alton-Lee, & Klenner, 2000) found "substantial evidence of the key role played by effective scaffolding in achieving higher outcomes for diverse students" (p. 77).

The metaphor of scaffolding is considered to be contentious by some experts (Jordan, 2004). It has been criticized as representing a mechanical, inert support, maintained by external forces (Stone, 1993). Rogoff (1998a), views scaffolding and working in

the ZPD as separate and distinct processes, and is critical of linking them because it creates a focus on the expert providing for the novice, and designates control to the adult.

Dufficy (2005, p.23) refers to scaffolding in the ZPD as "mediation in the zone of assisted performance." Mediation refers to a "process of intervention between the child and their surroundings, either by another human, or some kind of physical or symbolic tool" (Dufficy, 2005, p. 17). In educational settings, physical tools, such as rulers, tables, and computers mediate learners' perceptions and their opportunities for engagement by assisting them to act upon their environment. Symbolic tools include musical symbols, algebraic systems, mathematical symbols, and cultural artifacts such as carvings. However, language is considered to be the primary symbolic mediational tool in cognitive development (James, 2006; Palincsar, 1998).

Humans use language to mediate their own and others' understandings of the world. More knowledgeable adults or peers use language to mediate learning experiences for children by interpreting, reorganising, and restructuring ideas and problems to make them more comprehensible. Teachers play a crucial role in the mediation of learning by orchestrating the discussion in learning conversations to focus students' attention, encourage negotiation, and develop shared understandings (Dufficy, 2005; James, 2006; Palincsar, 1998; Pressley & McCormick, 1995). The use of language as a mediational tool in learning conversations between teachers and individual children, small groups, and the whole class is the focal point of the present study.

The concept of intersubjectivity, or joint attention, is pivotal to the mediation of learning, and is a crucial component of effective learning conversations. Intersubjectivity denotes a shared focus of understanding and purpose, which is believed to be the foundation of effective learning and cognitive development (Cullen, 2001; Jordan, 2004; Palincsar, 1998; Rogoff, 1990). Intersubjectivity creates a common ground for communication as each partner adjusts to the perspective of the other. It allows the teacher to judge what the learner already knows and understands in order to provide appropriate scaffolding.

Bruner (1984) claims that when peers work cooperatively on collaborative tasks the inherent social interactions contribute to cognitive development and learning. The discussion involved in peer collaboration is thought to promote the development of higher order thinking (Palincsar, 1998; Schunk, 2000). In an investigation into the development of five-year-old children's perceptions of school learning, Cullen and St. George (1996) found that "peer interactions provide valuable opportunities for establishing relationships with other children which support emergent forms of scaffolding, including metacognitive assistance to peers" (p. 17). However, Vygotsky himself contended that for cognitive development to occur in the course of interacting with a peer the partner should be more capable, and his use of the term collaboration was with reference to collaboration between teacher and student (Gredler, 2001; Rogoff, 1998b). Although peer collaboration undoubtedly provides learning opportunities for students in a number of circumstances, it is of peripheral interest in the present study, which focuses on the role of the *teacher* in mediating learning during interactions with students.

Vygotsky's theory is the subject of ongoing critique. Some experts consider that it is an overstatement to claim that all learning derives from the social environment (Gredler, 2001). Researchers have found that children are biologically disposed to acquire certain concepts independently of their environments (Geary, 1995), and that young children are able to develop understandings about the world long before they have the opportunity to learn them through their culture (Bereiter, 1994). Because of the complexity of Vygotsky's theory, there is a tendency to abstract parts from the whole, resulting in distorted applications and understandings (Gredler & Shields, 2004; John-Steiner & Mahn, 1996; Sfard, 1998).

Sfard (1998, p. 4) refers to two "metaphors for learning," the "acquisition metaphor" (for the individual cognitive acquisition process of constructivism) and the "participation metaphor" (for the participatory process of sociocultural theory). She discusses the "dangers of choosing just one" metaphor (p. 4) and claims that "too great a devotion to one particular metaphor can lead to theoretical distortions and to undesirable practices" (p. 4). Sfard suggests that a choice of approach should be made in accordance with the purpose of each teaching and learning situation. Some authors (e.g., Hatano, 1993, 1999; James, 2006; Palincsar, 1998) recommend merging or

coordinating individual and social constructivist perspectives in order to continue developing a more coherent theory. Recently, according to James (2006):

> … the constructivist approach in both theory and practice has taken on board the importance of the social dimension of learning: hence the increasing use of the term "social constructivism." Similarly, there is now evidence that sociocultural … frameworks are involved in a "discursive shift" to recognise the cognitive potential to explain how we learn new practices (p. 59).

A combination of Piaget's notion of the learner as an individual active constructor of knowledge, and Vygotsky's notion of the expert tutor within the ZPD, has given rise to co-constructivist perspectives of learning (Cullen, 2001). The term co-construction refers to adults and children making meaning, developing understanding, and building knowledge about the world *with* each other. Co-constructive theory acknowledges the learner's active, personal construction of knowledge while interacting and collaborating with others in the social context (Cazden, 2001; Cullen, 2001; Rogoff, 1990).

In 1974 Argyris and Schon first argued that there is a distinction between the espoused theories that professionals use to explain their actions to themselves and to external audiences, and the implicit theories-in-use upon which their actions are based. Eraut (2000, pp. 123) claims that there is often a "mismatch" between teachers' espoused theories and their theories-in-use, because while espoused theories are taught formally in teacher education programmes, teachers develop their own theories-in-use as they learn to cope with the practicalities of the classroom. Although research has established that understanding of learning theory strongly influences teaching performance and that it is an essential component of the professional knowledge base of teachers, practicing teachers in the United States, Australia, and New Zealand have been found to question the relevance of formal learning theory to their daily classroom practice (Darling-Hammond, 2000a, 2000b; Dufficy, 2005; Harnett, 1999; Wasley, 1999). James (2006) contends that teachers' understandings of learning often lack theoretical coherence. In support of this contention, anecdotal evidence gathered from New Zealand teacher educators suggests that many practicing teachers appear to have misunderstandings about constructivist theory, and gaps in their knowledge regarding concepts such as the ZPD, scaffolding, and the mediation

of learning. Further investigation is required to develop a more comprehensive understanding of the nature of teachers' beliefs about learning.

2.2 A knowledge base for teaching

A growing body of research worldwide suggests that teacher knowledge and expertise are the most important factors affecting student achievement (Alton-Lee, 2003; Bransford, Darling-Hammond, & LePage, 2005; Calderhead & Shorrocks, 1997; Darling-Hammond, 2000a, 2000b; Hattie, 2002; Shulman & Shulman, 2004). A teacher's professional knowledge base comes from a variety of sources. Professional knowledge embodies teachers' general intellectual ability, their level of general knowledge and educational achievement, their memories of how they were taught themselves, their pre-service observation experiences in classrooms, their academic courses (in curriculum, pedagogy, learning theory, and assessment theory), and the cumulative knowledge gained from personal classroom teaching experience (Bullough, 2001; Darling-Hammond, 1999; Grossman, 1990; Hiebert, Gallimore, & Stigler, 2002; Turner-Bisset, 1999, 2001).

In order to make decisions about the content and structure of teacher education programmes, standards used to evaluate teachers, and systems for certifying professional competence, a clearly defined and continuously evolving knowledge base for teaching is essential (Hiebert, Gallimore, & Stigler, 2002; Turner-Bisset, 2001). In the past there have been numerous schools of thought about what constitutes an appropriate knowledge base for teaching. Until the late eighteenth century the academic tradition of education required only the possession of subject knowledge. From the nineteenth century, the elementary tradition of education required craft knowledge of how to manage large classes, academic subject knowledge, and what was considered to be an appropriate set of moral values. In the early twentieth century the child development tradition saw knowledge of child development as essential, particularly for primary school teachers (Turner-Bisset, 2001).

Shulman (1987) was the first to develop a theoretical framework for a knowledge base for teaching. Shulman's knowledge base for teaching included the following seven categories:

- content knowledge
- general pedagogical knowledge (principles of classroom management and organisation)
- curriculum knowledge (materials and programmes)
- pedagogical content knowledge (amalgam of content and pedagogy)
- knowledge of learners and their characteristics
- knowledge of educational contexts (classrooms, schools, communities)
- knowledge of educational ends, purposes, and values

(Shulman, 1987, p. 8)

Since Shulman developed his model a number of other theoretical models have been produced (e.g., Turner-Bisset, 2001). In addition, a number of authorities (e.g., Clark, 2001; Hargreaves, 1998; Munby, Russell, & Martin, 2001; Olson & Bruner, 1996), recognising the difficulty of translating traditional research knowledge into forms that are useful to teachers, have explored the possibility of developing a "craft" knowledge base, which "is characterised more by its concreteness and contextual richness than its generalisability and context independence" (Hiebert, Gallimore, & Stigler, 2002, p.4).

In 1994 the Organisation for Economic Cooperation and Development (OECD), from a study of effective teaching, developed a holistic concept of teacher competencies across five key dimensions: knowledge of substantive curriculum areas and content; pedagogic skill, including the ability to use a repertoire of teaching strategies; reflection and the ability to be self-critical; empathy and commitment to the acknowledgement of the dignity of others; and managerial competence (OECD, 1994).

In recent years, teacher education and development programmes have placed an increasing emphasis on developing skills in reflective practice and the ability to work in communities of practice (discussed later in this chapter). Accordingly, Shulman and Shulman (2004, p. 259) have developed a conceptual framework of essential features of contemporary teacher preparation and professional development, which they believe should prepare teachers to be:

- Ready (possessing a vision of student learning and understanding)
- Willing (having motivation)
- Able (having pedagogical content knowledge and the capacity for intelligent and adaptive action)
- Reflective (conscious of understandings, performances, and dispositions, or capable of learning from experience)
- Communal (acting as a member of a professional community)

2.2.1 Subject content knowledge

A crucial element of an effective knowledge base for teaching is a comprehensive understanding of relevant subject content. Subject content knowledge is particularly important in enabling teachers to mediate students' understanding. Contemporary teaching approaches, based on interaction, discussion, and problem-solving, require teachers to be able to present critical ideas in meaningful ways, and to organise learning processes that build on individual students' prior knowledge. According to Jordan (2004), teachers must be able to engage effectively with children in the relevant body of knowledge in order to assess their understanding. They must also understand the progression of ideas within a topic and how students are likely to learn them (Bell & Cowie, 2001). This implies a need for highly educated teachers who have a deep understanding of subject matter.

However, teacher educators frequently express concern about the depth of subject content knowledge of many student teachers. According to Calderhead and Shorrocks (1997):

> There is a long-standing dilemma in teacher education. Ideally we may wish to have teachers who are not only competent actors in the classroom but also who are practitioners capable of understanding what they are doing, why they are doing it, and how they might change their practice to suit changing curricula, contexts, or circumstances. This produces a tension between the need for teachers to understand teaching and the need to be able to perform teaching (p.195).

Research across a variety of subject areas has revealed that lack of content knowledge can affect teachers' ability to present accurate information in coherent ways. A number of studies have investigated the subject content knowledge of secondary school teachers and student teachers. Gregg (2001) analysed the content of pre-

service geography teachers' lessons on rivers, and found that the teachers presented inaccurate information and allowed students' misconceptions to stand unchallenged. Their lessons lacked coherence because they covered peripheral rather than central concepts, and they misunderstood or ignored many important ideas. Soares and Prestage (2000), in a study of student teachers' ability to use graphical representations in science, found that most had developed routines that had led to automated learning behaviour in which mechanical procedures were being followed without understanding. Sanders and Morris (2000) tested student teachers' mathematical content knowledge and found that the majority of those who achieved poor results rationalised their failure. Only forty percent acknowledged that they had a problem and attempted to do something about it. Conversely, in a separate study of teachers' mathematical subject knowledge, Prestage and Perks (2000) found that strong content knowledge allowed teachers to answer questions correctly, and to develop connections and routes for students through the requisite knowledge.

Alexandersson (1994) conducted an investigation into twelve teachers' "consciousness" of their teaching. He discovered that the consciousness of seven of the teachers was directed towards what the pupils were to *do* in their lessons, rather than what they were to learn. The consciousness of four of the teachers was focused on general aims, such as the level of activity and developing relationships. The consciousness of only one teacher of the twelve was directed at developing understanding of specific content. Alexandersson (1994) believes that it is important that researchers investigate the different ways that teachers think and reflect about their own practice, in order to develop a more comprehensive understanding of teachers' professional knowledge and thinking.

International research findings suggest that the needs of learners are more likely to be met when teachers' subject content knowledge is sufficiently developed to allow them to critically engage with the subject material. However, Bullough (2001) claims that the emergence to prominence of constructivism in educational thought has led to a weakening of disciplinary truth and knowledge claims. He believes that teachers need assistance to think about their practice in more complex ways, in particular to reflect upon their role in the process of learning and the emphasis that they give to formal academic knowledge in their interactions with learners.

In New Zealand there have been very few investigations into the extent of teachers' subject content knowledge, or into their beliefs about its importance, particularly at the primary school level. Because of the need for New Zealand primary school teachers to cover all curriculum areas, accurate information concerning the depth and use of teachers' content knowledge would be particularly helpful to teacher educators and policymakers, especially those involved in making decisions regarding the length and content of teacher education programmes.

2.2.2 Pedagogical content knowledge

Central to most theoretical models of essential teacher knowledge is pedagogical content knowledge. Shulman (1987) was the first to use the term pedagogical content knowledge to identify the distinctive body of knowledge underpinning effective teaching. Pedagogical content knowledge is the blend of content, curriculum, and understanding of learning theory needed to communicate knowledge to learners. Within it, content and pedagogy are amalgamated into an understanding of how particular topics, problems, or issues may be organised, represented, and adapted by the teacher to suit the diverse interests and abilities of learners (Darling-Hammond, 1998, 2000a, 2000b; Shulman, 1987; Shulman & Shulman, 2004; Turner-Bisset, 1999, 2001; Wilson, Shulman, & Richert, 1987). Pedagogical content knowledge enables teachers to understand relationships and patterns, and to transform subject matter into a form that is comprehensible to learners, by representing ideas as metaphors, analogies, illustrations, examples, and demonstrations. Strong subject content knowledge and a sound understanding of the processes involved in learning are vital to this process (Borko, 2004; Jordan, 2004; Shulman, 1987; Shulman & Shulman, 2004; Turner-Bisset, 1999, 2001).

Hattie (2002), in a synthesis of over 500,000 studies of influences on student achievement, identified sixteen attributes of expert teachers, one of which is that "expert teachers have deeper representations about teaching and learning" (p. 5). Hattie claims that one of the ways in which expert teachers differ from others is in the way that they organise and use their knowledge. According to Hattie, expert teachers' knowledge is more integrated, they combine new subject content knowledge with

prior knowledge, can relate current lesson content to other subjects in the curriculum, and can adapt lessons to their students' needs and their own goals. Hattie contends that expert teachers have a greater ability to focus on significant information and to predict the types of errors students are likely to make when solving problems.

According to Shulman (1987) pedagogical reasoning and action involve a cycle of comprehension, transformation, instruction, evaluation, reflection, and new comprehension. The teacher firstly must comprehend the content to be taught, and subsequently be able to transform it into pedagogically powerful forms adapted to the needs of the learners. Effective instruction involves the use of flexible and interactive teaching techniques including giving clear explanations and vivid descriptions, interacting effectively with students, assessing work, questioning and probing, answering and reacting, and praising and correcting. Evaluation refers to the process of checking for understanding and misunderstanding that the teacher employs while teaching interactively. Reflection involves looking back on teaching and learning to analyse it in relation to specified ends or planned learning outcomes. From this the teacher arrives at a new level of comprehension of the purposes, the subject, the students, and the pedagogy employed. These processes do not represent fixed stages. They may occur in different order, and some may not occur at all during some acts of teaching. However, because they are central to effective teaching and learning, Shulman believed that all teachers should demonstrate the capacity to engage in them when required. Many of these processes are integral to effective learning conversations and consequently are of particular interest in the present study.

2.3 Learning conversations

Learning conversations are conversations in discussion-based lessons, in which the teacher is responsible for the facilitation of meaningful discourse. From a social constructivist perspective discourse is the primary tool for the mediation of cognitive development, and learning conversations provide the mechanism for developing higher-order thinking (Palincsar, 1998). The teacher leads the conversation to focus on relevant concepts, activate background information, build on students' ideas, and

guide students to new levels of understanding. Such conversations are geared towards creating opportunities for student's conceptual and linguistic development. They involve the explanation of relationships, the asking and answering of thought-provoking questions, the elaboration of conflict, and the correction of incorrect propositions. The teacher acknowledges the learner's own expertise, and teacher and learner develop shared understandings (Roehler & Cantlon, 1997; van Boxtel, van der Linden, & Kanselaar, 2000).

However, previous analysis of classroom discourse has revealed that classroom interactions are often more about managing the flow of the lesson than they are about real teaching and learning. Traditional instructional conversations involve cycles in which the teacher initiates an *interaction*, the student *responds*, and the teacher *evaluates* the response before making another initiation (IRE cycles) (Coulthard, Montgomery & Brazil, 1981). Research evidence suggests that in such conversations teachers often formulate low-level closed questions that are literal and factual in nature, to guide their lessons in particular directions and to keep students on task (Cazden, 2001; Dufficy, 2005; Latham, 1997; Mercer, 1995; Pressley & McCormick, 1995; Torrance & Pryor 1998; Young, 1992).

Young (1992) calls these questions "What Do Pupils Know-questions", and "Guess What Teacher Thinks-questions." Rather than to ascertain students' prior knowledge for assessment or diagnostic purposes, What Do Pupils Know-questions serve primarily to remind students of what they already know prior to moving forward. Guess What Teacher Thinks-questions seldom generate real thinking, with teachers often providing so many clues that they for all intents and purposes answer their own questions. Young found that teachers use this technique to avoid directly telling students the required information. When an incorrect answer is given it is reformulated by the teacher, so that students register it in a more correct or acceptable form. Teachers do this to avoid directly telling students that they have given the wrong answer.

Mercer (1995) has also found that teachers use common techniques to guide learning activities in particular directions. Mercer believes that teachers do this in order to construct a joint shared version of educational knowledge. He believes that teachers

use “talk” for three purposes; firstly, to describe shared experiences to reveal their educational significance; secondly, to elicit relevant knowledge from students so that the knowledge is seen to be owned by the students; and thirdly, to respond to what students say, both to give them feedback and to construct more generalised meanings. Mercer refers to the technique that teachers use to steer their lessons in the required direction as cued elicitation. Mercer claims that teachers ask questions for which they have a correct answer in mind in order to find out what students already know, and at the same time to share the requisite information with the rest of the class. The teacher will often ask one student after another, providing strong visual clues and verbal hints, until the correct answer is forthcoming.

Mercer (1995) concurs with Young (1992), contending that many teachers appear to go to considerable lengths to avoid directly “telling” students the required answer. Bransford, Brown, and Cocking (1999) suggest that teachers’ reluctance to “tell students anything” (p. 11) arises out of an incomplete understanding of constructivist learning theories that results in aspects of constructivist theory becoming established as a form of “dogma” within the teaching profession.

Teachers have been found to adhere rigidly to their lesson plans rather than following important opportunities for teaching and learning initiated by their students. Teachers also appear to hurry, interrupt, misunderstand, confuse, dominate, and constrict their pupils in classroom interactions (Pressley & McCormick, 1995). Lessons structured in this way send students the message that learning is about receiving knowledge from the teacher rather than working with knowledge to develop personal meaning and new understandings (Coulthard, Montgomery, & Brazil, 1981; Black & Wiliam, 1998b). This results in shallow rather than deep learning, and while lessons may proceed in an orderly fashion, they are frequently lifeless and uninteresting (Dufficy, 2005).

Learning conversations should resemble natural conversations, in which there are evolving meanings and real attempts to inform and persuade as the participants strive for joint understanding. One of the challenges for the teacher is to shape the conversation to get across important points without stifling creatively constructive and appropriate interpretations. In order to facilitate such true dialogue, teachers need

to relinquish some of their traditional power (Dufficy, 2005; Mercer, 1995; Pressley & McCormick, 1995).

Effective teachers use learning conversations as opportunities to mediate learning. They ask searching questions to assess students' current understandings and provide appropriate feedback to correct misunderstandings. They subsequently challenge and extend students' thinking by asking further questions and by providing additional information or alternative points of view. This process is also known as formative assessment.

2.3.1 Formative assessment

Effective teaching requires a deep understanding of the process of formative assessment and its close relationship to the scaffolding and mediation of learning. Formative assessment should be an integral part of teaching and learning, and "essentially synonymous with instructional scaffolding" (Shepard, Hammerness, Darling-Hammond & Rust, 2005, p. 279). Formative assessment is the process of examining the interaction between the student's knowledge, skills, and attitudes, and the learning activity (Bell & Cowie, 2001). The teacher is a mediator between the learner and the body of knowledge and skills to be learned, and learning is a process of negotiation and appropriation of knowledge in a social context (Black & Wiliam, 1998a). However, according to Black and Wiliam (1998b), there is a "black box" between teaching and learning that constitutes students' interpretation and utilisation of available understanding and skills. For this reason, they contend, there is no direct relationship between acts of teaching and what students learn.

Formative assessment involves using assessment information to inform subsequent teaching and learning. The teacher's role is to interact with learners to support and guide their learning. This process involves the teacher in noticing, recognising, and responding to students' thinking (Cowie & Bell, 1999). In responding to learners' needs the teacher intervenes where necessary as teaching and learning are occurring (Bell & Cowie, 1997; Black, 1993; Black & Wiliam, 1998a). Formative assessment involves observation and discussion with students during learning conversations. It is an ongoing part of scaffolding and mediating students' learning, and should not

involve a separate formal process. For example, while assisting a student to articulate strategies for solving a mathematical problem, the teacher should be able to diagnose the student's understanding in order to provide immediate and appropriate learning support (Turkanis, Bartlett, & Rogoff, 2001). This requires the teacher to engage in effective questioning, and to provide appropriate and constructive feedback.

2.3.2 Effective questioning

Questioning that promotes classroom dialogue is a key component of formative assessment (Black & Harrison, 2001; Black, Harrison, Lee, Marshall, & Wiliam 2002, 2003; Black & Wiliam, 2006a). The questions that teachers ask can have a profound impact on students' learning. The most effective questions for promoting deep learning are open questions to truly seek out students' personal understandings. Such questions are used to find out what students are really thinking, to ascertain the true depth of their understanding, and to extend and challenge their thinking. "Why?" questions have been found to be a very effective tool in assessing students' understanding (Latham, 1997; OECD, 2005). Young (1992) claims that teachers often become uncomfortable with this type of questioning because it causes them to lose control of their lessons by passing ownership to their students.

Black, Harrison, Lee, Marshall, and Wiliam (2002) suggest that if teachers are to improve their questioning more effort needs to be to be spent in framing "questions that are worth asking" (p. 7), or questions that explore issues that are critical to the development of students' understanding. This means a shift from the use of limited factual questions to the use of "big questions," that both "set the scene" (p. 7) for a lesson and evoke discussion. Black et al. claim "the only point of asking questions is to raise issues about which a teacher needs information, or about which the students need to think" (p.7).

Bloom's "Taxonomy of Educational Objectives" (1956) has been used to classify educational questions. Bloom's taxonomy incorporates six levels of thinking; basic knowledge or recall, comprehension, application, analysis, synthesis, and evaluation. McGee (2001) argues that if teachers developed their questioning skills to cover the whole range of Bloom's categories they would improve the development of students'

thinking. However, McGee also claims that many teachers experience difficulty with this because they have difficulty distinguishing between some of Bloom's categories.

Research has shown that after asking a question many teachers wait less than one second for a response. If none is forthcoming, they then ask another question, or they answer the original question themselves (Black, Harrison, Lee, Marshall, & Wiliam, 2002, 2003; Rowe, 1974). It is recommended that "wait time" be increased to several seconds in order to give students time to think, and that all students be expected to have an answer and contribute to the discussion (Black, Harrison, Lee, Marshall, & Wiliam, 2002; Black & Wiliam, 2006a; Rowe, 1974). However, teachers participating in an OECD (2005) study of the practice of formative assessment found that "when they started using formative assessment techniques, giving students thinking time was perhaps one of the hardest things to get used to" (p. 62).

2.3.3 Effective feedback

Formative assessment involves identifying progress and providing feedback to students in order to promote deep learning (Black, Harrison, Lee, Marshall, & Wiliam, 2002; Black & Wiliam, 1998b; Pryor & Torrance, 1997). In her synthesis of New Zealand research on teaching and learning, Alton-Lee (2003) established ten researched-based characteristics of quality teaching. One of these is pedagogy that "scaffolds and provides appropriate feedback on students' task engagement" (p. 73), in which "students receive effective, specific, appropriately frequent, positive, and responsive feedback" (p. 73). Tunstall and Gipps (1996) believe that the most effective feedback is that which occurs in conversation or discussion with the learner.

The quality of feedback given to the learner is of fundamental importance. According to Sadler (1998):

> By quality of feedback, we now realise we have to understand not just the technical structure of the feedback (such as its accuracy, comprehensiveness, and appropriateness) but also its accessibility to the learner (as a communication), its catalytic and coaching value, and its ability to inspire confidence and hope (p. 8).

Feedback should provide students with the necessary information to assist them to close the gap between current and desired performance (Ramaprasad, 1983; Sadler,

1989; Shepard, Hammerness, Darling-Hammond & Rust, 2005). Feedback is more effective when teachers share learning objectives or intentions with students at the beginning of the lesson or prior to commencing a task. This results in students being more highly motivated and task-oriented, better able to make decisions about how to go about the task, and better able to understand and make use of feedback to close the performance gap (Clarke, 2001; Sadler, 1989, 1998).

Askew and Lodge (2000) describe feedback *discourse* in relation to three different models of learning. In the receptive-transmission model of learning they claim that feedback is characterised as a "gift" (p.5) from the teacher who is perceived as an "expert" (p. 4). They have coined the phrase "killer feedback," "to describe situations when the receptive-transmission form of feedback blocks learning" (p. 6). In the constructivist model of learning feedback is characterised as a "ping-pong ball" (p. 10) to be "batted back and forth" (p. 13) within linear and hierarchical relationships. In the co-constructivist model of learning feedback is characterised as "loops of dialogue and information" (p.13) in which feedback is much less concerned with judgement, and enables the learner to review learning in context and in relation to previous understanding.

Tunstall and Gipps (1996) have developed a typology of teacher feedback to learners, in which they distinguish between evaluative feedback and descriptive feedback. Evaluative feedback is non-specific feedback, either positive (rewarding or approving), or negative (punishing or disapproving), that tells students how well they have done. Descriptive feedback is responsive and specific, describing features of students' work or thinking. Tunstall and Gipps recommend descriptive feedback that "constructs achievement," or heightens awareness of and reflection on work in progress, and descriptive feedback that "constructs the way forward," or suggests possibilities for future development, as being the most influential on learners' achievement. Wiliam (1999) also claims that feedback to students should be focused on what they need to do to improve rather than on how well they have done.

Knight (2003) used Tunstall and Gipps' (1996) typology of teacher feedback in a New Zealand study of teachers' oral feedback to students in numeracy lessons. She found that of 349 examples of oral feedback recorded, 83 percent was evaluative, and

only 17 percent was descriptive. Seventy-four percent of the teacher feedback fell into Tunstall and Gipps' evaluative/positive category (general praise, positive facial expressions), and *no* feedback focused on constructing the way forward. Further investigation into teachers' understanding of the role of feedback in the mediation of learning, and the types of feedback provided by New Zealand primary school teachers, could be used to inform future teacher education and development.

Black and Wiliam (1998a) have found that teachers in the United Kingdom often provide feedback related to social and managerial issues rather than students' learning. Torrance and Pryor (1998) believe that schools have developed praise cultures, and that the focus of feedback on praise is a legacy of behaviourist reinforcement systems developed to manage student behaviour. Anecdotal evidence suggests that this is also the case in New Zealand primary schools, an issue requiring further investigation.

In 1981 Brophy provided a "functional analysis" (p. 5) of teacher praise. In this seminal work he concluded that praise was typically used "without contingency, specificity, or credibility" (p. 5), that it did "not correlate with student achievement gains" (p. 15), and that it had "a variety of intended and actual functions in addition to reinforcement of student conduct or academic performance" (p. 27). Brophy concluded:

> Rather than just assume its effectiveness, teachers who wish to praise effectively will have to assess how individual students respond to praise, and in particular, how they mediate its meanings and use it to make attributions about their abilities and about the linkages between their efforts and the outcomes of those efforts (1981, p 27).

Wiliam (1999) has found that praise can have unanticipated negative effects on student motivation, and that "the best teachers appear to praise slightly less than average" (p. 9). While praise may have positive effects on learners, and it has some value in classroom interactions when used *alongside* feedback, it is not in itself considered to be a form of feedback (Hattie, 2001; Hill & Hawk, 2000; Sadler, 1989). Feedback is the most important element of formative assessment, but according to Clarke (2003), it is the element "most laden with a legacy of bad practice and misguided views" (p. 3).

Teachers' beliefs regarding learners and learning have a profound impact on the nature of the feedback that they provide. Every teacher has a personal set of beliefs about the purposes of education, about students and their characteristics, about the nature of knowledge, and about the process of learning. These beliefs influence their actions and interactions in the classroom (Black & Wiliam, 1998a; Clarke, 2003; McGee & Penlington, 2001; Shulman 1987; Turner-Bisset, 2001; Yero, 2002). Because teachers' beliefs strongly influence their interactions with students, it is critical that teachers examine those beliefs. To achieve this level of insight, teachers must have the ability to reflect on and evaluate their own performance.

2.4 Reflective professional development

Teaching is a complex activity involving a constant stream of interactions between teachers and students (McGee & Penlington, 2001). Effective teaching requires the ability to be aware of learning possibilities in every interaction (Turner-Bisset, 2001; Yero, 2002). Effective teachers are able to be self-conscious, to think systematically about their performance, and to perceive aspects that could be improved upon (Hammerness, Darling-Hammond, & Bransford, 2005).

2.4.1 Teacher reflection

The ability to reflect upon teaching practice has been considered a key element of effective teaching since the writings of Dewey (1974). Dewey's notion of reflection involves thinking that evolves from a state of doubt, through a search for new information, to problem resolution. Reflective thinking is a form of inner dialogue in which a person relives experience, and examines beliefs, perceptions, and outcomes, in order to inform and transform knowledge and action. It is the process of making informed and logical decisions about practice, and then assessing the consequences of those decisions (Loughran, 1996; McTaggart & Wilson, 2005).

The capacity to reflect is developed to different stages in different people and it determines an individual's ability to learn from experience (Loughran, 1996). Van Manen (1977) referred to three levels of reflective thinking, the technical level, the contextual level, and the critical level. Reflection at the technical level is limited and occurs in isolated episodes. It is focused on behaviours and skills, and involves simple theoretical description. Reflection at the contextual level is focused on alternative practices and choices based on knowledge and value commitments. It involves clarification and elaboration of underlying assumptions, it deals with the relationship between theory and practice, and it considers problems in the immediate context. Reflection at the critical level addresses moral, ethical and sociopolitical issues. It involves analysis and comparison of theory, disciplined inquiry, individual autonomy, and self-understanding.

Turner-Bisset (2001) describes stages in teachers' ability to reflect. According to Turner-Bisset, in the early stages teachers try to explain classroom events and to rationalise poor performance in terms of external factors over which they have no control, and for which they cannot be blamed. In the highest stages of reflection teachers are able to "reconceptualise the curriculum, subject knowledge, knowledge of self, and models of teaching and learning, in the light of political, social, and ethical considerations" (p.112).

Schon (1983, 1987) discussed the need for practitioners to reflect critically on their thoughts and actions in order to enhance their professional practice. Schon rejected the separation of theory and practice, and proposed a model of "knowing-in-action" in which the epistemology of professional practice is grounded in and inseparable from practice. The goal of reflection is for practitioners to be able to see for themselves the relationships between means, methods, and results. Schon believed that the process of understanding and improving one's teaching must start from reflection upon one's own experience. Schon discussed practitioners' ability to engage not only in *reflection-on-action*, which involves thinking back over practice in a systematic or deliberate way, but also to engage in *reflection-in-action*, which involves revising personal constructs of teaching and learning while engaged in practice. While reflecting-in-action, teachers are actively interpreting and developing their classroom practice in relation to personal and professional frames of reference.

Although opportunities for contemporaneous reflection often arise during lessons, they may not always be acted upon. The way that teachers recognise and respond to such opportunities is an indication of their awareness of the complexities of the teaching and learning environment and their ability to adjust to the associated demands of classroom teaching (Loughran, 1996). Turner-Bisset (2001) acknowledges that teachers are constantly juggling with multiple and immediate demands in complex settings. She suggests that while teachers may register problems with students' understanding during their teaching, they may be so involved with the immediate demands of the lesson that, of necessity, problems are stored to be deliberated upon later. McNamara (1990) also argues that it is extremely difficult for teachers to reflect upon their practice during the interactive phase of teaching, and that in order to be able to do so, teachers need to be explicitly taught how. Classroom based reflective professional development can assist teachers to identify the habits and beliefs that influence their behaviour, and to subsequently transform their pedagogy (Day, 1999; Turner-Bisset, 2001; Yero, 2002).

2.4.2 Classroom-based professional development

The quality of teachers' classroom work is closely related to their ability to grow and develop professionally (Hargreaves & Fullan, 1992). The very nature of teaching demands that teachers engage in career-long professional development in order to extend their professional knowledge and thinking (Day, 1999). However, teachers often complain that the professional development programmes in which they are involved have limited application to the real world of classroom teaching. Lieberman and Wilkins (2006) cite comments from teachers such as: "That was an interesting workshop, but I don't see how I can use that information in my classroom," (p. 124) and "I wish these after-school in-services were more applicable to my needs and my students" (p. 124). McCarthy (2006) refers to the following complaints from teachers: "This staff development programme was a waste of time" (p. 45) and; "I had to leave my students and travel across the country for something that has no value for me. I'd rather be back in my classroom with my kids" (p. 45).

Teachers are interested in professional development that they consider to be personally useful and relevant to their experiences in the classroom (Day, 1999; Poskitt, 2005). Where professional development is focused on topics that teachers perceive to be relevant they are more likely to be "willing to experiment with new strategies and transfer theoretical understandings to classroom practice" (Poskitt, 2005, p. 141). According to Poskitt (2005):

> It is important therefore that professional development programmes *adapt* content and delivery to suit the individual needs of teachers and schools. Moreover the teachers need to be involved in analysing their own professional needs and determining the content, pace and style of professional development (p. 140).

Recently there has been an emergence of school-based professional development, aligned with the needs of particular schools and designed and led by teachers (Craft, 2000; Hargreaves & Fullan, 1992; Lieberman & Wilkins, 2006; McCarthy, 2006; Poskitt, 2005).

Mitchell and Cubey (2003) from a "best evidence synthesis" of relevant research, have developed eight characteristics of effective professional development linked to enhanced pedagogy and children's learning. According to Mitchell and Cubey (p. 81), effective professional development:

- Incorporates participants' own aspirations, skills, knowledge, and understanding into the learning context
- Provides theoretical and content knowledge, and information about alternative practices
- Involves participants in investigating pedagogy within their own settings
- Involves participants in analysing data from their own settings
- Has critical reflection as a core aspect, enabling participants to investigate and challenge their assumptions and extend their thinking
- Supports educational practice that is inclusive of diverse students and their families
- Helps participants to change educational practice, beliefs, understandings, and attitudes
- Helps participants to gain awareness of their own thinking, actions, and influence

Zeichner (1996) has criticised the emphasis in professional development on individual reflection rather than collaborative sharing, and argues "despite the lofty rhetoric surrounding efforts to help teachers become more reflective," little has been done "to

foster genuine teacher development and enhance teachers' roles in school reform" (p. 201). Others have argued that in order to overcome the inherent private and isolated nature of teaching, and the tendency toward individualism in school cultures, teacher development should involve creating supportive networks of teachers who can collaborate and learn from each other (Craft, 2000; McLaughlin, 2005).

2.4.3 Collaboration in communities of practice

When teachers collaborate with each other about aspects of their practice, communities of practice emerge. Contemporary conceptions of teacher development are increasingly informed by theories of learning in a community (e.g., Cochran-Smith & Lytle, 1999). This focus has evolved out of research movements that call for teachers to collaborate and participate in classroom-based research alongside university researchers (Zeichner & Knoffke, 2001) and is informed by sociocultural theory (Bruner, 1996: Vygotsky, 1978), which emphasises situated and contextualised learning within such communities.

In her investigation into teachers' participation in the processes and activities of professional development, Borko (2004) used "sociocultural conceptual frameworks and the group as a unit of analysis to examine the social context of the classroom and patterns of participation in learning activities" (p. 4). Borko found evidence that strong professional learning communities, that were founded on the establishment and maintenance of trust, and that featured collaborative interactions in which teachers worked together to examine and improve their practice, fostered both teacher learning and instructional improvement.

Zorfass and Keefe Rivero (2005), who used communities of practice to help teachers integrate technology tools into the curriculum, found that collaboration assisted the teachers in making "slow but sure incremental changes in their use of technology" (p. 59). They found that collaboration in a community of practice allowed the teachers to share their areas of strength and to acquire knowledge to address areas of need. They claim that participation in a community of practice allows teachers, with the support of their colleagues, "to translate ideas into practice" and "to drive classroom change based on genuine concerns" (p. 59).

The requisite knowledge and skills base for teaching can be developed and deepened when teachers work together in school-based communities of practice, engaging with relevant theory, and observing, critiquing, discussing, and reflecting on their own and each other's practice (Craft, 2000; Poskitt, 2005). According to Poskitt (2005):

> To be effective, communities of teacher practice require groups of people who can meet on a regular basis, have common interests, engage in effective communication processes, recognise and value the expertise of all parties involved, include people with a range of interests and expertise, prepared to work collaboratively and to continually improve practice (p. 138).

Sometimes outside facilitators are involved in school-based professional development programmes, often contributing "new skills and perspectives" (Poskitt, 2005, p. 146). They may take on a coaching role, working side by side with teachers, observing their practice and offering critique and alternative models of effective practice (Neufeld & Roper, 2003). Collaboration between schools and universities can lead to the development of collaborative communities of practice involving teachers and teacher educators. In such communities of practice, emphasis is placed on participation and the co-construction of understanding, moving all participants beyond their accustomed ways of doing things (Day, 1999; Sachs, 1997). In the present action research study, I worked with the participating teachers as an outside facilitator, and as we established a relationship of trust and mutual respect, working together and learning from each other, we gradually developed an effective community of practice.

2.4.4 Action research as professional development

Many teachers have found action research to be a particularly rewarding form of professional development because of its direct links with classroom practice (Craft, 2000). Action research has many of the characteristics of effective professional development identified by Mitchell and Cubey (2003). It provides theoretical knowledge, it incorporates the participants' own skills and knowledge, it involves the participants in investigating their own pedagogy and in analysing data within their own settings, it has critical reflection as a core aspect, and it helps the participants to gain awareness of their own thinking and behaviour in order to change their beliefs and practices.

Action research helps teachers to examine their own practice and its impact on student learning in relation to their personal expectations. It has been claimed that self-study helps teachers to become more open to new ideas, that it helps them to become more self-confident about their ability to promote student learning, that it helps them to develop reflective skills, and that it encourages them to develop more collegial interactions (Zeichner, 2001). Zeichner claims that action research results in positive outcomes when participation in the research is voluntary, when a culture is created that respects the knowledge and voices that the teachers bring to the research experience, and when the teachers themselves control most aspects of the research process. According to Zeichner the intellectual challenge and stimulation of the action research process helps teachers to think more deeply about their practice, especially when the research takes place over an extended period of time. By involving teachers in theorising their own practice and revising personal theories in the light of their practical consequences, action research is more likely to bring about improvements in teaching and learning for students. Because action research is the chosen methodology for the present study, it will be discussed in detail in the next chapter, *Action Research Theory*.

2.5 Conclusion

This chapter reviewed the literature concerning two contemporary learning theories, along with research relevant to other components of the requisite knowledge base for teaching. It also examined the research literature concerning classroom learning conversations. This review of the relevant strands of literature has revealed that, overall, there has been little research into the nature of New Zealand teachers' knowledge and beliefs about learning, especially in relation to the effects of their beliefs on their classroom practice. More information is needed about New Zealand teachers' understanding of formal learning theory, their beliefs about learning, and the influence of their thinking on their interactions with students in classroom learning conversations. The nature of teacher-student interactions in classroom learning conversations, particularly in relation to teacher questioning and feedback, also

requires more in-depth investigation in New Zealand classroom settings. It is evident from this literature review that investigation into interactions between teachers and students in classroom learning conversations may reveal disparities between teacher beliefs and practice. The literature also suggests that investigation into the relationship between teachers' beliefs and practice may be most effectively achieved through classroom-based reflective professional development using the process of action research.

CHAPTER THREE

ACTION RESEARCH THEORY

> ***Action research combines research into substantive issues … with research into the process of development, in order to deepen understanding of the enablers of, and barriers to, change. It is a means whereby research can become a systematic intervention, going beyond describing, analysing, and theorising social practices to working in partnership with participants to reconstruct and transform those practices (Somekh, 2006, p. 1).***

This study originated out of my interest in the quality of learning conversations in primary school classrooms. I was primarily interested in exploring the ways in which teachers' knowledge and thinking affect their interactions with students in classroom learning conversations. However, rather than simply setting out to extend my own knowledge by investigating teachers' thinking and practice, I also wished to contribute something back to the participating teachers in the form of reflective professional development. Because action research methodology involves teachers in a partnership of learning and empowers them in the process of developing their knowledge of both research and pedagogy, it presented as the most appropriate methodology for achieving this purpose.

This chapter provides a review of the theory of action research methodology. It begins by examining postmodern paradigm influences on researchers' choices of methodology. Action research is defined, and key figures and perspectives in the development of action research methodology are introduced. The action research process and different types of action research are outlined, and collaborative research partnerships and their associated challenges are discussed. Finally, methods of data collection and analysis used in action research are outlined, along with issues related to the validity, reliability, and generalisability of action research.

3.1 Postmodern paradigm influences

The notion of "paradigms" as overarching frameworks for the organisation of our perception of the world originated in the work of Thomas Kuhn (1962). Kuhn first demonstrated that taken-for-granted frameworks, which he called paradigms, organise all human perception and thinking. Paradigms determine how knowledge and research are approached and defined. Researchers are guided by particular paradigms, and the associated ontological and epistemological beliefs influence their research questions, their choice of research methodology, and their methods of data collection and analysis (Guba & Lincoln, 1994; Kember, 2000; Lincoln & Guba, 2000).

During the age of "Enlightenment" in the seventeenth century, the worldview of Western civilization shifted from a practical philosophy based on experience and particular, practical cases, to a theoretical philosophy concerned with the general, the timeless, and the universal. The prevalent worldview for the next three hundred years was that of modernism, along with the closely associated research paradigm of logical positivism. Positivism is based on a metaphor of linear progress, absolute truth, and rational planning (Reason & Bradbury, 2001). There is a belief in an objective reality about which knowledge can be gained from direct experience and verified by independent observation. Positivist research methods are mainly quantitative, and relationships among variables are usually represented in mathematical and statistical terms (Kember, 2000; Lincoln & Guba, 2000; Reason & Bradbury, 2001).

Around the middle of the twentieth century, in response to the emergence of constructivist theory, the modern worldview began to give way to postmodernism, in which a distinction is drawn between the world and our interpretive experience of it. Postmodernism has led to the emergence of a number of alternative research paradigms in the social sciences (Guba & Lincoln, 1994; Lincoln & Guba, 2000; Reason & Bradbury, 2001). The basic beliefs and positions of these paradigms are summarized in Table 3.1 (p.43).

Table 3.1: Basic beliefs and positions of alternative inquiry paradigms (adapted from Lincoln & Guba, 2000, pp. 168-173)

Period	**Modernism** ⟷	**Postmodernism**		
Paradigm	**Positivism**	**Interpretivism/ Constructivism**	**Critical Theory**	**Participatory***
Ontology	Naive realism – "real" reality; universal and general; apprehendable	Relativism - local and specific; constructed realities	Historical realism - virtual reality; shaped by social and political values	Participative reality; subjective-objective reality
Epistemology	Dualist/objectivist; findings true	Transactional/ subjectivist; created findings	Transactional/ subjectivist; value mediated findings	Participatory; experiential, propositional; co-created findings
Knowledge interests	Technical	Practical	Critical/ emancipatory	Practical - critical/ emancipatory
Methodology	Experimental/ manipulative; verification of hypotheses; chiefly quantitative methods	Hermeneutic/ dialectic; fieldwork, ethnograpy, phenomonography; chiefly qualitative	Dialogic/dialectic; analytical; action research	Participation in collaborative action inquiry; practical; use of language; shared experience; action research
Knowledge accumulation	Accretion-"building blocks" adding to "edifice of knowledge;" generalisations and cause-effect linkages	Vicarious experience; understand perspective of participants	Historical revisionism; critique social injustices; change; emancipation	In communities of inquiry; relational, reflexive, representational forms of knowledge
Inquirer posture	"Disinterested scientist;" informer of decision makers, policymakers and change agents	"Passionate participant;" facilitator of multi-voice reconstruction	Researcher and object of study interactively linked; participant; change agent	Primary voice in aware self-reflective action; secondary voices in illuminating theory
Values	Excluded – influence denied	Included – formative – influence acknowledged		
"Goodness" or quality criteria	Conventional benchmarks of "rigour;" internal and external validity, reliability, and objectivity	Trustworthiness and authenticity	Historical situatedness; erosion of ignorance and misapprehensions; action stimulus	Congruence of experiential, representational, propositional, and practical knowing
Control	Resides solely in researcher	Shared between inquirer and participants	In "transformative intellectual;" returns to community in new constructions	Shared to varying degrees
* Entries in this column are adapted from Heron and Reason (1997)				

The interpretive, or constructivist, paradigm developed mainly out of sociological inquiry (McNiff, 2002). This paradigm is based on a belief in a socially constructed, subjectively-based reality and researchers use qualitative methodological approaches, such as ethnnography, phenomonography, and hermeneutics in order to interpret or develop understanding of participants' viewpoints (Arhar, Holly & Kasten, 2001; Kember, 2000; Lincoln & Guba, 2000; McNiff, 2002; Reason & Bradbury, 2001).

Critical theory developed out of the "Frankfurt school" in the early twentieth century, where theorists focused attention on the changing nature of capitalism, and analysed forms of domination that accompanied this change (Kincheloe & McLaren, 1998). Habermas developed critical theory further in the 1970s. Habermas (1972, 1974) posited three forms of knowledge interests, technical, practical, and critical (emancipatory). Critical theorists consider that reality is shaped by political and social values. Their aim is to emancipate people through varying degrees of social action, from the overturning of specific unjust practices to the radical transformation of society (Arhar, Holly, & Kasten, 2001: Carr & Kemmis, 1986; Kember, 2000; Lincoln & Guba, 2000; McNiff, 2002; Reason & Bradbury, 2001). Critical theory is dialectic, and emphasises discourse and analytical skills. It is associated with emancipatory forms of action research (Carr & Kemmis, 1986).

In recent years a participatory worldview has emerged. The participatory paradigm views humans and communities as part of, embodied in, and co-creating their world. A participatory perspective is both situated and reflexive, arguing that there is an objective reality, while acknowledging the constructivist perspective that people's attempts to articulate reality are subjectively and culturally framed. It also draws on emancipatory traditions, because it involves critical awareness (Fals Borda, 1979; Heron & Reason, 1997; Lincoln & Guba, 2000; Reason & Bradbury, 2001).

The present study is guided by a participatory worldview. Participatory methodology involves participation in collaborative action and inquiry, exploring relational, reflexive, and representational forms of knowledge. The interests of participatory methodology are primarily practical, involving the use of language grounded in shared experiential contexts. According to Reason and Bradbury (2001):

> The participative metaphor is particularly apt for action research, because as we participate in creating our world we are already embodied and breathing beings *who are necessarily acting* - and this draws us to consider how to judge the *quality* of our acting. … A participatory perspective asks us to be both situated and reflective, to be explicit about the perspective from which the knowledge is created, to see inquiry as a process of coming to know, serving the democratic, practical ethos of action research (p. 7).

3.2 Action research

Action research is a participatory form of inquiry. In simple terms, action research is a process that involves people in directly researching their own social situations. It arises from practical questions, and is characterised by the interlinking of action and reflection in order to investigate and improve practice, solve problems, and develop knowledge (Altrichter, Posch, & Somekh, 1993; Kember, 2000; McNiff & Whitehead, 2005). According to Reason and Bradbury (2001):

> Action research is a participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview … It seeks to bring together action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions to issues of pressing concern to people, and more generally the flourishing of individual persons and their communities (p. 1).

Action research developed out of the work of Lewin in the 1940s (McNiff, 2002; Reason & Bradbury, 2001; Zeichner, 2001). Lewin developed and applied his theory in a series of community related studies in social psychology. The central tenets of Lewin's work were the ideas of group decision-making and commitment to improvement. Lewin was aware of the potential of democratic practice for both self-determination and social engineering, and he argued that in order to understand and change social practices, practitioners from the real social world should be included in all stages of an inquiry (Kemmis & McTaggart, 1988; McNiff, 2002). Lewin developed a theory of action research comprising a spiral of steps, each of which is composed of planning, fact-finding (or reconnaissance), execution, and evaluating the result of the action (Lewin, 1946; McNiff, 2002). Lewin's work focused on organisational cultures, but he did not address wider social and political issues.

In the 1950s, Corey (1949, 1953) brought action research into the field of education. Corey emphasised the importance of educational practitioners conducting their own research in order to improve their actions, and he believed that the possible contribution of action research to the improvement of educational practices had been seriously underestimated. Corey saw action research as a more exact, objective, and scientific form of teachers' everyday efforts to improve their practice. He believed that rigorous and systematic data collection could produce dependable and

appropriate evidence, which could then be tested against understanding of both classroom culture and educational theory. Corey emphasised the importance of incorporating the ideas, attitudes, and interests of the participants in order to make research projects more meaningful and authentic, and to increase the likelihood of their findings being acted upon (Corey, 1949, 1953). Corey was concerned with issues at the school and classroom level, and he did not consider the implications of political, social, cultural, and systemic influences on teachers and their work.

Stenhouse, in the 1970s, developed the idea of the "teacher as a researcher" (McNiff, 2002; Zeichner, 2001). Stenhouse believed that pedagogical change was dependent on teachers' capacities for reflection. Through their work in the Humanities Curriculum Project in the 1970s, Stenhouse and Elliott developed the idea of teachers as researchers further, into that of "teachers as action researchers." The project team attempted to encourage teachers to experiment with teaching strategies and to reflect on the difficulties that they encountered. Their research approach was interpretive, but the researchers had more power in the research process than the teachers they worked with (McNiff, 2002). According to Elliott (1991) it was not possible to satisfactorily resolve the issue of how to facilitate autonomous reflective practice, because the experimental action strategies and self-training procedures had been structured according to *the project team's* understanding of pedagogy. As a consequence, the project team developed "an important conceptual distinction between the 'research role of the outsider' in relation to the 'research role of the insider practitioner' and contrasted the *first-order inquiry* of the teachers with the *second-order inquiry* of the central team" (Elliott, 1988, p. 32).

This distinction became a major focus of the action research literature of the 1970s, and was further developed in the Ford Teaching Project. The project had a central team of two academics, Elliott and Adelman, who worked with more than forty teachers in twelve schools in conducting action research into the problems associated with the implementation of inquiry and discovery teaching methods in their classrooms (Elliott, 1991; McNiff, 2002; Zeichner, 2001). Elliott believed that the "teachers' increasingly active involvement in collecting, sharing, and discussing data changed the pedagogical theories underpinning their practices" (1991, p. 35). Elliott claimed that Lewin's action research model was limited in that it was based on the

assumption “that a ‘general idea’ could be fixed in advance, that ‘reconnaissance’ is merely fact finding, and that ‘implementation’ is a fairly straightforward process” (Elliott, 1991, p. 70). Elliott believed that the general idea should be allowed to shift, by revision at the beginning of each cycle. He believed that implementation of an action step is not always straightforward, and that it is necessary to monitor the extent to which it has been implemented before an attempt is made to evaluate the effects.

The developing interest in teachers as reflective practitioners in the 1980s was in part underpinned by the work of Schon (1983). Schon’s work related to developing professionalism through reflective practice, and it led to deeper understanding of reflective processes. Schon (1987) perceived difficulties when professional skills become tacit and automatic. He believed that new learning develops only when professionals are able to reflect on their tacit knowledge. As discussed in the previous chapter this requires professionals to be able to engage not only in reflection-on-action, which involves thinking back over practice in a systematic or deliberate way, but also in reflection-in-action, which involves revising personal constructs of teaching and learning while engaged in practice (Schon, 1983, 1987).

During the 1980s Habermas’ theory of critical social science had a strong influence on the development of ideas related to action research (Carr & Kemmis, 1986). In Australia, academics from Deakin University were particularly interested in the critical theory movement and developed a critical-emancipatory approach to action research. Carr and Kemmis’ (1986) *Becoming Critical: Education, Knowledge and Action Research* remains a highly influential text for educational researchers, and it is regarded as a seminal work in its field. Carr and Kemmis contend that teachers must establish communities of critical action researchers by progressively involving students and other members of school communities in the collaborative enterprise of self-reflection. Kemmis built upon Lewin’s original conceptualisation of action research. He developed a model of the action research process that follows a self-reflective spiral of planning, acting, observing, reflecting, and re-planning, as the basis for understanding how to take action to improve an educational situation (Kemmis & McTaggart, 1988).

3.2.1 The action research process

Action research is generally considered to be a process involving a spiral of self-reflective cycles of:

- Planning a change,
- acting and observing the process and consequences of the change,
- reflecting on these processes and consequences, and then
- re-planning, and so forth (Kemmis & McTaggart, 2000; Kemmis & Wilkinson, 1998).

Most action research projects go through two or more cycles in an iterative process. However, as in the present study, action research is more than a mechanical sequence of steps, and the process is often not as neat as the spiral of cycles might suggest. The stages frequently overlap, and initial plans often become obsolete or redundant in the light of learning from experience. The process is fluid, open, and responsive. The measure of success is not whether the steps in the process have been followed faithfully, but whether there has been development in the participants' understandings and practice (Kemmis & McTaggart, 2000; Kemmis & Wilkinson, 1998). Action research is frequently an untidy process, because the issues being investigated are often poorly defined. Projects often have many strands that have to be organised and tidied into a linear form. According to Cook (1998) the process of writing up action research transforms "bumbling change supported retrospectively by theories" (p. 99) into something that appears clear and logical in written form.

3.2.2 Types of action research

There is a great deal of literature on action research, in which the classification of various types or approaches differs from author to author. Henry and McTaggart (1996) claim, "action research is a term which is used (and misused) to cover a myriad of activities" (p. 6). A number of authors (e.g., Kemmis & McTaggart, 2000; Hendricks, 2006) discuss several approaches to educational action research, including classroom action research, critical action research, collaborative action research, and participatory action research. Each of these approaches is briefly summarised below.

Classroom action research

Classroom action research involves teachers in collecting data in their own classrooms in order to make judgements about how to improve their own practice. It is associated with the use of qualitative, interpretive methods of inquiry, and has a practical emphasis (Cardno, 2003; Hendricks, 2006; Henry & McTaggart, 1996; Kemmis & McTaggart, 2000). Classroom action research places particular value on the interpretations that teachers make, based on data that they have collected with their own students (Hendricks, 2006).

Critical action research

Critical action research has a commitment to bring together broad social analyses of the use of discourse and power and the collective self-study of practice, in order to initiate action to improve situations. The aim is to reveal the injustices and disempowerment in industrialized societies that are attributable to social class, ethnicity and gender (Cardno, 2003; Hendricks, 2006; Henry & McTaggart, 1996; Kemmis & McTaggart, 2000). Critical action research is undertaken by mixed groups of participants, including university researchers, teachers and principals, and community members, who may seek assistance from others to initiate and sustain changes and improvements. It has been criticised for bringing radical ideology and academic discourse into social settings and for making participants dependent on radical theorists for emancipation and reform (Kemmis & McTaggart, 2000). Although critical emancipatory action research projects are described in a number of publications, (e.g., Kemmis & Grundy, 1997), the degree to which the *teachers* involved in such projects have actually been engaged at the critical emancipatory level has been questioned (Zeichner, 2001).

Collaborative action research

A number of authors (e.g., Arhar, Holly, & Kasten, 2001; Day, 1999; Elliott, 1991; Grundy, 1998; Hendricks, 2006; MacPherson, Aspland, Elliott, Proudford, Shaw, & Thurlow, 1998; Salzman, Snodgrass, & Mastrobuono, 2002; Wells, 2001) use the term collaborative action research to specifically refer to research partnerships between teachers and teacher educators. Collaborative action research involves teachers and teacher educators conducting research collaboratively in school and classroom settings, investigating real world issues and problems related to school

administration and classroom practice, and providing sustained assistance to teachers in order to improve teaching and student learning (Hendricks, 2006; Zorfass & Keefe Rivero, 2005). One of the goals of collaborative action research is to encourage dialogue between educational stakeholders in different settings (Hendricks, 2006).

Participatory action research

In recent years, in recognition of the practical and theoretical convergences between collaborative action research and the broader participatory research paradigm, researchers have used the term participatory action research to describe their work (Hendricks, 2006; Kemmis & McTaggart, 2000; Kidd & Kral, 2005). Participatory action research is a social and collaborative process that involves researchers and participants working together, developing goals and methods, gathering and analysing data, and implementing the results in ways that raise critical consciousness and promote change in the lives of those involved. It may involve an emphasis on emancipatory change at sociocultural and structural levels (Fals Borda, 1991; Kemmis & McTaggart, 2000; Kidd & Kral, 2005). Participatory action research engages people, either individually or collectively, in examining their own understandings, skills, and values, and the ways in which they interpret themselves and their actions in the social and material world (Kember, 2000; Kemmis & Wilkinson, 1998).

Participatory action research examines changes in organisations, in social relationships, in activities and practices, and in language and discourse. Participants work together to explore the ways in which their practices are shaped by wider cultural, political and economic structures, and deliberately set out to contest and to liberate themselves from the irrational, inefficient, unproductive, unjust, unsatisfying, or alienating (Hendricks, 2006; Kemmis & McTaggart, 2000; Kemmis & Wilkinson, 1998). Habits, customs, precedents, traditions, control structures, and bureaucratic routines are investigated in order to identify the contradictory and the irrational (Kemmis & Wilkinson, 1998). Participatory action research allows teachers to examine their purposes and intentions in teaching, and to develop new knowledge while engaging in the deliberate and systematic study of their own classroom practice. It allows teachers to clarify their individual beliefs and understandings by making their assumptions explicit (Kember, 2000; Kemmis & McTaggart, 1988).

The present study began when I initiated a collaborative action research project with two classroom teachers. I initiated the project, as an outside facilitator, in order to investigate both the effects of the participating teachers' knowledge, skills, and thinking on their classroom practice, and the effects of classroom-based reflective professional development on that classroom practice. At the beginning the project was predominantly researcher driven, but as the study progressed the participants became more empowered as researchers and more involved in the action research process. By the final action research cycle, when there was a much greater sense of shared participation and ownership, the study had developed into a more participatory action research approach .

3.3 Working in collaborative action research partnerships

Action research projects that are collaborative in nature involve the establishment of communities of practice in which members interact regularly, discuss ideas, and learn together in order to improve practice. Participants build trust, develop a sense of common purpose, and access and generate new knowledge.

Evans, Lomax, and Morgan, (2000) describe a school-university partnership that led to the establishment of a community of teacher-researchers. The group developed close bonds, and formed supportive discussion networks through which they were able to share professional concerns and empathise with each other's experiences. The collaborative thinking enabled the members of the group to change and improve their practice. Salzman, Snodgrass, and Mastrobuono (2002) carried out a collaborative action research project in a high school that created the desire within the high school staff to change their instructional practices in the area of writing for thinking. The research techniques also helped to demonstrate the positive impact that the staff development programme had on students' work. Ross, Rolheiser, and Hogaboam-Gray (1999) conducted a collaborative action research project with five experienced Canadian teachers. The research contributed to the knowledge base of teaching by creating a framework for self-evaluation, added to the personal practical knowledge

of the teacher-researchers, and enhanced their expectations about their ability to bring about learning.

Collaboration with outside facilitators in action research projects empowers teachers to improve their practice by providing them with access to research tools and data. When teachers share control of the research, and are involved in collecting their own data about their own practice, they are more likely to use the findings productively. When teachers are involved in researching their own practice they articulate their intentions, test their assumptions, and make connections that allow them to theorise about their practice (Ross, Rolheiser, & Hogaboam-Gray, 1999). However, there are a number of challenges associated with working in collaborative action research partnerships.

3.4 Challenges associated with collaborative action research partnerships

Action research involving research partnerships between academics and classroom teachers is not always straightforward. Such partnerships are difficult to develop and sustain. The expectations of the two groups regarding the substantive and procedural elements of the research process may not always be compatible. Universities are concerned with the systematic gathering of knowledge, formal examination of evidence, professional criticism, and the discussion of possibilities. Schools are dominated by action, concrete knowledge, and "busyness" (Day, 1999). According to Day (p. 163), "the disabling effect of the two task cultures upon long-term relationships should not be underestimated." Elliott (1988, 1991) was the first to discuss the challenges associated with collaboration in action research, in particular the dangers of practitioners being "colonised" by university academics. Elliott first identified a number of tensions in action research partnerships between academics and teachers, which are outlined below.

3.4.1 Insider - outsider relationships

University academics are often involved in collaborative classroom research projects

as outside facilitators. While insiders have the advantage of greater situational knowledge of the school culture, the outsider may bring a more objective perspective to the situation. The challenge of the insider-outsider relationship in action research is for the outsider to develop greater awareness of specific, situational realities, and for the insiders to develop a wider educational perspective. Action research should empower the participants (insiders) to take command of their own understandings and actions. The power relationships established between university based "outsiders" and school-based "insiders" may affect the character of the research undertaken by influencing the issues that are addressed, the data gathering and analysis, the character of reflection, and the interpretations reached (Grundy, 1998; Elliott, 1988; Zeichner, 2001). Difficulties may arise in relation to the establishment of a relationship of equality and trust between the facilitator and the participants. When insider-outsider relationships are equal there is room for greater tolerance of divergent viewpoints (Day, 1999; Elliott, 1988; Grundy, 1998).

The role of the outside facilitator should be to initiate reflection and to scaffold the participants towards independence in the research process. The skills of the facilitator are pivotal (Poskitt, 2005). Effective facilitators have a range of knowledge, process, and interpersonal skills, including understanding of adult learning and development, a broad view of education, knowledge of theory, and a sound understanding of pedagogy. Effective facilitators need to be able to think clearly and incisively, run effective meetings, ask key questions, identify key issues, and provide guidance and support. Most importantly, they should also be able to develop effective relationships, establish trust, listen effectively, resolve conflict, and demonstrate the enthusiasm required to inspire and motivate participants (Poskitt, 2005).

Although the concept of facilitation signifies the commitment of outside academics to shifting the locus of power in educational enquiry and action towards the participants, the hierarchical nature of knowledge may make this difficult in practice. Some collaborative action research projects may resemble the more established forms of teacher professional development that replicate traditional hierarchies of knowledge and power, while others display respect for teachers' knowledge and seek to develop teacher autonomy and control (Zeichner, 1999).

Grundy (1998) contends that “parity of esteem” of the knowledge and expertise of school and university based practitioners needs to be explicitly worked through, and the different forms of knowledge delineated. Ross, Rolheiser, and Hogaboam-Gray, (1999, p. 255) believe that equal partnerships are dependent on group members acknowledging that “each partner has a distinctive body of knowledge that is complementary (permitting a shared framework for joint work) and nonoverlapping (which fosters interdependence and makes cooperation worthwhile).” In the present study a long-standing professional relationship existed between the outside researcher and the participating teachers before the research process began. The pre-established rapport and trust, along with genuine respect for each other’s knowledge and skill bases, assisted in the development of an effective research team.

3.4.2 Theory and practice

Researchers and teachers may have different concerns, purposes, and questions when conducting action research. These different concerns are what led to the conceptual distinction between the first-order inquiry of the teachers, and the second-order inquiry of the researchers first noted in the Humanities Project. The relationship between theory and practice is dependent on discourse between academics and teachers, grounded in the first-order practical domain of the teacher and the second-order theoretical domain of the facilitator. Educational action research is a dialectical process of testing theory against practice and developing theory through practice (Elliott, 1991).

Generally teachers regard theory as something quite remote from their professional experience and of little practical value. Because theory has been produced by “experts,” teachers often consider it to be a threat to their professional knowledge (Darling-Hammond, 2000a, 2000b; Dufficy, 2005; Elliott, 1991; Harnett, 1999; Wasley, 1999). Academics involved in action research are usually interested in developing links between classroom practice and educational theory, while teachers tend to focus more specifically on solving practical classroom problems (Day, 1999). However, although the teachers in the present study volunteered to participate chiefly to improve their classroom practice, they were also keen to learn more about the theory underpinning it.

3.4.3 Individuality and collaboration

Professional understanding grows when individuals share knowledge and adopt it or adapt it for themselves. Ideally, when collaborative communities of peer practitioners engage in dialogue to move their practice forward, dialogical communities of self-reflective practitioners are established (McNiff, 2002). However, institutionalised differences may prevent the development of democratic and open relationships, and team members may have different interests, strengths, and levels of commitment to the collaborative community. The idea of developing critical communities is problematic for a number of reasons. Teaching is essentially a private pursuit, carried out within the walls of the classroom. As a result, teachers may prefer to reflect individually rather than collectively. Data sharing promotes reflective conversation, but it carries the risk of bringing latent conflicts and tensions to the surface (Elliott, 1991).

If collaborative research partnerships are to be successful all participants should be involved in the planning from the very beginning. The establishment of working relationships must take account of the existing cultures within each setting, and the culture that the two groups establish together. Trust and communication should be developed, along with understanding of the different perspectives of participants and the constraints of their different institutions. Accountability, levels of collaboration, and issues related to intellectual property should be clarified from the outset (MacPherson, Aspland, Elliott, Proudford, Shaw, & Thurlow, 1998). The teachers involved in the present study had a long-established, open, and collegial relationship as equal members of a teaching team, and were accustomed to working collaboratively. This facilitated open and honest communication in the data sharing process.

3.4.4 Teachers as researchers

Teachers as researchers may face a number of dilemmas arising from a clash of professional values between their craft culture and the culture of reflective practice. Teachers involved in action research usually see themselves firstly as classroom

teachers with primary loyalty to their pupils. They consequently may have difficulty with dedicating segments of their time to research which they consider to be an "optional extra," and they may be confronted with an ethical dilemma if the research process distracts them from their primary teaching responsibilities (Day, 1999; Elliott, 1991). Every attempt was made to minimize this problem in the present study, with very few demands placed on the teachers' time, particularly at the beginning of the study. As the teachers became more involved in the research they voluntarily committed more time to it.

The process of investigating and changing an organisational culture may become political, as the status quo is challenged and power relationships are transformed. The sharing of ideas and information and the challenging of an existing culture involves risk-taking on the part of the participants. When problematic areas of practice are exposed teachers may become vulnerable to criticism. They may feel that they are undermining their own professional status when opening themselves to criticism from pupils and colleagues. As was the case at the beginning of the present study, teachers often prefer to collect quantitative data because it is less personal, and helps them to distance themselves from any disturbing revelations about their own or their colleagues' practice (Elliott, 1991).

3.5 Common methods of data collection

A wide variety of data gathering techniques are employed in action research projects, including interviews, observations, fieldnotes, audiotaping, video recording, reflective journals, questionnaires, document analysis, and photographs. Those used in the present study are briefly outlined below.

Interviews

Interviews are used to find out information about participants' experiences, knowledge, opinions, beliefs, and feelings (Best & Kahn, 2006). Interviews gather descriptive data in the participant's own words. They are rich sources of qualitative data (Bogdan & Biklen, 1998; Cardno, 2003). Interviews may be structured, semi-

structured, or unstructured. Less structured interviews are more flexible and allow interviewees to express their point of view more freely (Bogdan & Biklen, 1998; Elliott, 1991).

In a structured or fixed-response interview the questions and response categories are fixed in advance, and a large number of questions can be asked in a short period of time. Data analysis is relatively simple, and responses can be directly compared. However, interviewees are forced to fit their responses into the researcher's categories, which may not provide an accurate account of their thoughts, opinions, or feelings (Best & Kahn, 2006). Unstructured interviews resemble informal conversations. The questions emerge in context and are asked in the natural course of the conversation. This increases their relevance, and provides a more accurate account of what the respondent is thinking and feeling. However if relevant questions do not arise naturally as part of the conversation the answers do not always provide useful or comprehensive information. Because different information is collected from different participants with different questions, responses cannot be compared, and data organisation and analysis is often complex and difficult (Best & Kahn, 2006).

In the present study semi-structured interviews were used to gather information about the ways in which the participating teachers conceptualised their pedagogical content knowledge and classroom practice. Semi-structured interviews, which have pre-set questions but allow interviewees to digress and raise issues or topics that they wish to pursue, are often most useful. In semi-structured interviews all interviewees are asked the same basic open-ended questions, the wording and sequence of which are fixed in advance. However, there is more flexibility for interviewees to express their ideas fully and freely. In semi-structured interviews, interviewers are able to ask extra, discretionary questions to gain more detailed information, or to pursue a point made by the interviewee (Best & Kahn, 2006). Because all interviewees are asked the same basic questions most of their responses can be compared, and it is easier to organise and analyse data. However, semi-structured interviews do not provide the opportunity to gain understanding of the way in which interviewees structure the topic themselves because the standardised questions may constrain the naturalness and relevance of the questions and answers (Bogdan & Biklen, 1998; Elliott, 1991; McNiff & Whitehead, 2005).

Care and skill are required to conduct successful interviews (Cardno, 2003). Interviewees should be informed of the purpose of the interview, and assured that their responses will be confidential. In good interviews, participants are put at ease and encouraged to talk freely about their points of view. Most interviews begin with informal conversation to develop a rapport, particularly when the interviewer and interviewee are strangers (Bogdan & Biklen, 1998). Good interviewers are attentive, and communicate interest to participants with their facial expressions, gestures, and body language. Interviewers may ask for clarification if responses are ambiguous or difficult to understand (Bogdan & Biklen, 1998). Interviewers should listen carefully to participants' responses, and assist them to formulate their thoughts without being directive. While the purpose of open-ended interviewing is to find out what is in the participant's mind, care should be taken not to put things into the participant's mind. Interviewers must understand their role and not express their personal opinions, as responses may be biased if participants are aware of the perspective of the interviewer (Best & Kahn, 2006).

Unstructured and semi-structured interviews provide participants with the opportunity to raise their own issues and concerns, but are time-consuming to analyse (Kember, 2000). It is preferable to audio record the interview if the respondent is willing. Consent must be granted and confidentiality assured before an interview can be recorded. Participants may be self-conscious about having their voice recorded. Some will seek reassurance that private information will not be revealed to others, either on the recording itself or in the form of a written transcript (Bogdan & Biklen, 1998). (Audio recording is discussed in more detail later in this chapter). If the interviewee is not willing to be recorded the interviewer should take notes to be expanded on immediately after the interview, when the information is still fresh (Best & Kahn, 2006).

Observations

Observation is used to collect data on the behaviour or learning of teachers and students. Observations are used to investigate social interactions, physical activities, nonverbal communications, planned and unplanned activities, and the effects of environmental factors. The observer should also watch for "non-occurrences" or

things that should have happened and did not (Best & Kahn, 2006). Several observations may take place over an extended period of time, or there may only be one brief observation. Some observations are conducted with a particular focus, while others may have a more open framework (Best & Kahn, 2006; Bogdan & Biklen, 1998).

The setting and the purpose of the observation will determine the choice of techniques, such as anecdotal recording, running records, event recording, or time sampling (Cardno, 2003). In quantitative research, observation is used to collect data regarding the number of occurrences of specific behaviours or events. In qualitative research, detailed or "thick" descriptions are recorded (Best & Kahn, 2006). The observer's role may vary from a full participant (e.g., teachers observing in their own classrooms) to a complete outsider (e.g., a researcher sitting in the back of the classroom). The presence of an outside observer may affect the behaviour and responses of the persons being observed. This may be overcome by taking the time to establish rapport and a relationship of trust, and by trialing observations to familiarise the participants with the procedures (Best & Kahn, 2006; Bogdan & Biklen, 1998; Elliott, 1991).

Fieldnotes

Observation is often referred to as fieldwork because it takes place "in the field." Because later recall cannot be trusted to be accurate it is essential that the researcher take fieldnotes in sufficient detail in order to recreate the observations later (Best & Kahn, 2006). There are two types of fieldnotes, descriptive and reflective (Bogdan & Biklen, 1998). Descriptive fieldnotes are an important factual record of events and critical incidents that the researcher observes (Arhar, Holly, & Kasten, 2001; McNiff, 2002). Descriptive fieldnotes may take the form of detailed descriptions of people, events, or activities, records of time or event sampling, verbatim comments, or continuous running commentaries over an entire period of observation (Bogdan & Biklen, 1998). Reflective fieldnotes contain the observer's reactions, feelings, and systematic thinking about the events recorded. They may include the researcher's conceptualisation of the situation under investigation, hypotheses to be tested, and statements about emerging problems and issues. These analyses should be cross-referenced against the relevant evidence upon which they are based. Reflective

fieldnotes are one way in which the researcher can attempt to acknowledge and control observer effects (Bogdan & Biklen, 1998; Elliott, 1991). Fieldnotes should also contain basic but important information, such as the date, time, situation, persons present, and activities taking place (Best & Kahn, 2006). The recording of observational fieldnotes is a time-consuming procedure. It is important that the person recording is able to keep up and record notes in sufficient detail to ensure accuracy. Fieldnotes should be written up later in a systematic fashion (Bogdan & Biklen, 1998; McNiff & Whitehead, 2005).

Audio-recording

When observing in classrooms, or when interviewing, some form of recording is essential for an accurate record of what is said, because it is often impossible for an observer or interviewer to note in written form everything that takes place. It is important to gain informed consent before recording participants during observations or interviews (Kember, 2000). Recordings are valuable for capturing spontaneity when people are expressing their ideas and opinions (McNiff & Whitehead, 2005). Audio recording can be used to record lessons and classroom conversations in their entirety. Although non-verbal behavior such as body language or facial expressions cannot be recorded, tone of voice, inflection, expression, and volume provide valuable information to assist with interpretation. High quality, portable recording devices are less obtrusive and distracting, and provide the best possible clarity of recording. Transcribing of interviews and recorded lessons is immensely time consuming, but is extremely worthwhile, as the researcher is able to read backwards and forwards through the transcript, and to concentrate on the detail of what is recorded to a greater degree (Elliott, 1991; Kember, 2000; McNiff, 2002).

Reflective journals

Reflective journals are useful if kept on a continuous basis. They can be used to keep a record of both the action and the participant's reflective development (McNiff & Whitehead, 2005). McNiff and Whitehead suggest that when making reflective journal entries, participants should ask themselves the following kinds of questions on a systematic basis:

- What have I done?
- What have I learned?

- What is the significance of the learning?
- How will the learning generate new actions?

The contents of reflective journals should be properly and accurately dated. They can be used to record actions, reactions, observations, feelings, interpretations, hypotheses, hunches, explanations and reflections. Reflective journals are potent tools for collecting, analysing, and interpreting data (Arhar, Holly, & Kasten, 2001). Reflective journals help participants to reconstruct events retrospectively. Entries may vary in length and detail, but should convey factual and affective information in enough detail to allow for accurate reconstruction at a later date (Elliott, 1991). Although reflective journals are rich sources of data, participants should be reassured that they are confidential and that they do not have to be shared. However, as in the present study, researchers can negotiate access to this material with participants as part of the research process (McNiff, 2002).

3.6 Data analysis in action research

Although action research may sometimes include the collection of quantitative data, it most commonly involves the collection of qualitative information. In qualitative research, data analysis is the process of systematically reviewing and organising the data collected during the research process in the form of fieldnotes and transcripts. Analysis involves working with the data, breaking it into manageable units, organising it, sorting it, searching for patterns, and making decisions about what is important and what is *not* important (Altrichter, Posch, & Somekh, 1993; Best & Kahn, 2006; Bogdan & Biklen, 1998). In action research, data analysis is an ongoing process that happens throughout the study, rather than at the end (Altrichter, Posch, & Somekh, 1993; Bogdan & Biklen, 1998).

An important part of qualitative data analysis is the organisation (or coding) of material into categories or themes. There are two recognised methods of coding data. With the deductive method the categories are based on the researcher's theoretical knowledge, and the data are then searched for what may be relevant. In this case the categories are independent of the data. With the inductive method, the categories are

chosen during and after examination of the data. In this case the categories are derived from the data (Altrichter, Posch, & Somekh, 1993). In the present study a mixture of deductive and inductive analysis was used to code the participating teachers' utterances in their lesson transcripts. The method of coding used is described in more detail in Chapters Four and Five.

Developing a coding system involves searching the data for patterns and topics, and recording words and phrases to represent the topics as coding categories (Bogdan & Biklen, 1998). The coding categories may be suggested by research questions, theoretical approaches, or academic disciplines. Some of the ways in which data may be coded include contexts, situations, methods, events, activities, processes, strategies, social relationships, or subjects' perspectives and ways of thinking (Bogdan & Biklen, 1998). Altrichter, Posch, and Somekh (1993) suggest approaching inductive data analysis by reading through the entire text (e.g., transcript) and highlighting passages of interest, re-reading the highlighted passages and deciding upon a one word category for each, listing the categories on a separate sheet, and then cross-referencing the category sheet with the text.

3.7 Issues of validity, reliability, and generalisability

Action research has a number of limitations. It may be accused of lacking precision because of a reliance on subjective judgements. For the same reason the risk of bias is high, especially when teachers are involved in evaluating their own practice. In addition, although they may sometimes prove to be generalisable, the findings of action research are usually limited to the setting in which the research is conducted.

Validity and reliability

Validity refers to the accuracy, trustworthiness, or credibility of data and research findings, while reliability refers to the consistency of data gathered over a period of time (Mills, 2000). In action research meticulously kept records and documentation of results, often over an extended period of time, can help to provide support for the conclusions reached, and may contribute to reliability and validity. The assistance of a

critical friend to provide feedback on all phases of the project may also help to minimise bias (Arhar, Holly & Kasten, 2001; McNiff &Whitehead, 2005).

In action research, *triangulation* is often used to assess both the validity and reliability of collected data and its interpretation. Triangulation is a method of bringing together different types of evidence from different sources (in the present study, interview responses, observational fieldnotes and transcripts, and reflective journals) for comparison and crosschecking (Best & Kahn, 2006; Mills, 2000). Triangulation of recorded data is believed to reduce subjectivity. Evidence from the different sources is compared, and convergence or divergence noted. Examining an issue from different angles is considered to lead to greater depth of understanding. The different sets of data are opened up for discussion in order to argue and justify the veracity of interpretations. Where the different sources converge, the interpretation is considered to be more credible. In cases of divergence, evidence can be checked against recordings and transcripts. It is desirable that the parties involved discuss points of disagreement, preferably under neutral chairmanship (Arhar, Holly, & Kasten, 2001; Elliott, 1991; Kember, 2000).

The term triangulation has also been used to refer to the bringing together of multiple voices. In educational action research this usually means the voices of teachers, students, observers, and fellow participants (Kember, 2000). According to Altrichter, Posch, and Somekh (1993) triangulation gives a more detailed, balanced picture of a situation, makes contradictions visible, allows a deeper interpretation, and breaks the "hierarchy of credibility" by giving equal status to all participants. However they also state that triangulation requires a great deal of effort to set up, and that many teachers see it as threatening.

Generalisability

Generalisability refers to the applicability of research findings to different contexts and settings (Mills, 2000). Best and Kahn (2006) suggest that in order to address the issue of external validity and the limited generalisability of findings in action research, the researcher should acknowledge the need to replicate the study and its findings. Scott and Weeks (1998) believe that it is time to "demystify" the notion that external validity, replication, and generalisation are essential in educational research.

They believe that research that is interpretively sensitive to specific contexts, conditions, individuals, and interactions is equally valid. Scott and Weeks consider research to be an ongoing dialogical process in which both personal and academic reflections play a vital part. Evans, Lomax, and Morgan (2000) prefer the term "transferability" to that of generalisability. McNiff and Whitehead (2005, p. 92) contend that it is "impossible … to produce concrete proof" that research findings are credible and trustworthy, and suggest that production of reasonably valid evidence is enough. Somekh (2006) claims that:

> … knowledge acquired from qualitative research is generalisable to similar settings … and … knowledge acquired from research involving close partnerships with participants is quickly validated and appropriated by those in similar settings who recognise its immediate usefulness (p. 3).

3.8 Conclusion

This chapter has examined the theoretical aspects of action research methodology, with a particular focus on the features and challenges of action research involving collaborative partnerships between teachers and teacher educators. A detailed account of the more practical aspects of the current research is provided in the next chapter, *Embarking on the Research Journey.*

CHAPTER FOUR

EMBARKING ON THE RESEARCH JOURNEY

> ***Because action research is a methodology that closely involves participants in a social situation it is necessarily strongly influenced by their values and culture. The history of the group, its traditions, the kinds of tools it uses to mediate its activities, its dominant discourses and regimes of truth, the institutional structures in which it is framed and the political constructions of power and ideology that enable and constrain its activities, all play a part in determining how action research methodology is shaped to the group's purposes and the kinds of knowledge that are generated by action research projects (Somekh, 2006, p. 31).***

In this chapter the research design for the present study is introduced, and the practical aspects of setting up the research process are outlined. The selection of the school that was to become the research site is briefly explained, as is the recruitment of the participating teachers. Ethical considerations pertaining to the study are discussed and the delimitations of the study are outlined. The chapter then sets out the specific methods of data collection and analysis pertaining to the study, and concludes with a brief overview of the four cycles of action research.

4.1 An action research approach

As stated in previous chapters, my intentions in embarking on this study were to investigate teachers' knowledge, thinking, and beliefs on their ability to effectively mediate students' learning in classroom learning conversations, and at the same time, to provide the participating teachers with opportunities to investigate, reflect upon, and develop their professional knowledge and practice. The study was guided by the following questions:

- How do teachers conceptualise their pedagogical content knowledge?
- What factors influence the quality of learning conversations in classrooms?

- What changes occur in teachers' knowledge and thinking as a result of reflective professional development?
- What changes occur in teachers' practice as a result of reflective professional development?
- What changes occur in learning conversations as a result of reflective professional development?

Because it involves recursive cycles of data collection, analysis, and reflection, action research allows the investigation of practice while simultaneously providing opportunities to reflect upon and develop practice (Somekh, 2006). Action research frequently involves collaborative partnerships between teachers and teacher educators in school and classroom settings, in which issues and problems related to classroom practice are investigated, and in which teachers are supported in reflecting upon and developing their teaching (Arhar, Holly, & Kasten, 2001; Day, 1999; Elliott, 1991; Grundy, 1998; Henry & McTaggart, 1996; Kemmis & McTaggart, 2000; MacPherson, Aspland, Elliott, Proudford, Shaw, & Thurlow, 1998; Salzman, Snodgrass, & Mastrobuono, 2002; Wells, 2001; Zorfass & Keefe Rivero, 2005).

Action research usually involves a spiral of self-reflective cycles (Lewin, 1946), which generally include planning a change, acting and observing the process and consequences of the change, reflecting on these processes and consequences, and then re-planning (Kemmis & McTaggart, 2000; Kemmis & Wilkinson, 1998). The design for the present study was an adaptation of this model, involving a series of questions, observation and analysis, followed by reflection, and ending with a new series of questions. The study involved four action research cycles, which are outlined at the end of this chapter.

As the outside facilitator I proposed the initial idea for the research, which was refined after discussion with the participating teachers. During the study I worked with the teachers, observing and transcribing their classroom learning conversations, to assist them in critiquing and reflecting upon their practice. Throughout the research process the teachers were fully involved in the analysis of data, and in the interpretation of the findings. The teachers examined their observation transcripts and in the process developed their understanding of their own practice and their skills in self-reflection. I acted as a critical friend, and provided a sounding board against

which the teachers developed ideas for further action. We interacted regularly, discussing ideas, and learning together. As the study progressed we developed a relationship of trust and a sense of common purpose. As the teachers became more involved in the research and developed greater ownership of the process, we established a small community of practice that became progressively stronger and more effective.

4.2 Approaching the school

A large urban New Zealand primary school with over 500 students (Years 1 to 6) was selected as the potential site for this study. I chose to invite this particular school to participate in the study for several reasons. It had a history of stable staffing and it was considered by the Education Review Office to be a successful primary school. On previous visits to the school, in my role as a visiting lecturer for student teachers, I had been impressed with the general tone of the school, with the approachability of the principal, and with the professionalism, skill, and reflective practice demonstrated by the teachers I had encountered. Because I had been visiting the school regularly over a period of seven years, I had developed a strong rapport with many of the teachers, to the point where, in *their* words, I had become "a part of the furniture." I believed that this familiarity and rapport would be an important factor in the action research process, because it would allow me to be viewed more as a colleague and peer than as an outside expert, and thus facilitate the development of an effective community of practice.

After gaining approval for the study from the Massey University Human Ethics Committee I wrote to the Principal (Appendix A) to invite the school to participate in the study. He expressed interest in having the school involved in the research and undertook to discuss the idea with the senior management team. With the subsequent support of the senior management team I then made a written approach to the Board of Trustees (Appendix B) seeking formal approval to conduct research in the school. After receiving informed (voluntary) consent (Appendix C) from the Principal and Board of Trustees I attended a staff meeting and spoke to the whole teaching staff to

explain the rationale for the research and the proposed action research process. I asked for voluntary expressions of interest from groups of teachers in the same teaching team or syndicate, preferably teaching at the same level, to participate in the research group.

4.2.1 The participating teachers

Three teachers from the senior school teaching team (Years 5 and 6) volunteered to participate in the study, although one of the teachers withdrew from the study (before data collection commenced in her classroom) because she had been appointed to a teaching position in another school. The two remaining participants, Anne and Ruth (pseudonyms), were very keen to participate in the research process, mainly for the professional development opportunities it would provide. The two teachers had previously demonstrated a strong commitment to professional development. They had both recently upgraded their teaching qualifications from a Diploma in Teaching to a Bachelor of Education (Teaching) degree, a process involving several years of part-time university study. I had previously observed student teachers in their classrooms and had been impressed by the quality of supervision that they had provided, and by their demonstration of reflective teaching practice. Both teachers had more than 20 years of teaching experience, were widely respected by the Principal and their teaching colleagues, and were considered to be capable, skilled, classroom teachers.

Anne and Ruth had been working together as equal members of the same teaching team for several years, they had established an open relationship, and they were accustomed to working collaboratively. In my role as a teacher educator I had worked with the two teachers in their classrooms periodically over a period of seven years, long enough to have established a strong working relationship with both teachers that was based on mutual respect for each other's areas of expertise. From the beginning I stipulated that my responsibility in the action research process was to be the facilitator for group research, that we were all going to learn from the study, and that the teachers were the "experts" in their own classrooms. My role was to empower the teachers as *practitioners* by providing them with the evidence required to facilitate

discussion and reflection on their classroom practice, and also as *researchers* by equipping them with the research skills used in the action research process.

4.3 Ethical considerations

In research involving children, ethical considerations are particularly important. Since the 1980s, the social sciences have developed codes of ethics for professional and academic conduct. The guiding principles for such ethical codes of conduct are that subjects should not be exposed to risks that may outweigh the benefits of the research, that they should enter research projects voluntarily, and that they should understand the nature of the project, their obligations to it, and any dangers involved (Arhar, Holly & Kasten, 2002; Best & Kahn, 2006; Bogdan & Biklen, 1998; Cardno, 2003). The present research was planned in accordance with the Massey University "Code of Ethical Conduct for Research, Teaching, and Evaluations Involving Human Participants," and was reviewed and approved by the Massey University Human Ethics Committee (PN Protocol No: 02/143).

4.3.1 Informed consent

Research participants have the right to be informed about the nature and consequences of research projects in which they are involved. Respect for human freedom and autonomy generally includes two conditions, that the participants must agree to participate voluntarily and without coercion, and that their agreement must be based on full and open information about the project (Arhar, Holly & Kasten, 2001; Best & Kahn, 2006; Christians, 2000; McNiff, 2002).

All participants entered this study voluntarily. Although the teachers were the main participants, the focus on classroom learning conversations, which by definition include students, meant that data were also collected from students. For this reason it was necessary to obtain informed consent from teachers, students, parents, and caregivers.

At each phase of the study, the Principal, Board of Trustees, participant teachers, students, parents, and caregivers, were fully informed about the nature and purpose of the study, and possible risks of the research process. All participants, along with the parents and caregivers of students, were provided with Information Sheets (Appendix D), and asked to complete Consent Forms (Appendix E).

4.3.2 The right to privacy, confidentiality, and anonymity

Codes of ethics insist on safeguards to protect the identities of the participants and the research location. Confidentiality should be assured and safeguards put in place to avoid unwanted exposure. All personal data about individual participants in a study should be kept private and confidential or made public only behind a shield of anonymity (Arhar, Holly & Kasten, 2001; Best & Kahn, 2006; Bogdan & Biklen, 1998; Christians, 2000; McNiff, 2002). In the present study the participating teachers were asked to sign confidentiality agreements (Appendix F) because during the collaborative reflection process they were involved in reading and discussing each other's lesson transcripts. The verbatim transcripts of each classroom observation were shared only with the consent of the participant concerned. Care was taken when reporting the results of the study to ensure that individual participants would not be identifiable. For this reason the teachers have been assigned pseudonyms, and students assigned a "false" initial, in the written reporting of this study.

4.3.3 Accuracy and fairness

A cardinal principle in social science research is that the information collected and presented is accurate. Fabrications, fraudulent materials, and omissions are unethical (Best & Kahn, 2006; Bogdan & Biklen, 1998; Christians, 2000). In the present study analysis of the observational data, including the interview transcripts, the observational fieldnotes, and the lesson transcripts, was checked with the participating teachers to ensure accuracy of interpretation and "fairness" to the teacher concerned. Twenty-one observations took place in each teacher's classroom, over a period of nearly two years, in order to collect representative data and to avoid the recording of selected isolated incidents. Meticulous records were kept to provide support for the conclusions reached, and to contribute to reliability and validity. The risk of bias from

subjective judgements when participants are involved in evaluating their own practice was minimised by drawing on a variety of sources to clearly document what occurred. The effects of the presence of the researcher and the use of recording devices were taken into consideration when interpreting the information.

4.4 Delimitations of the study

For manageability purposes the study was confined to a single school, within which the participant group was restricted to volunteers. The study was concerned with the participating teachers' knowledge and thinking about teaching and learning, and with the effects of such knowledge and thinking on the quality of their interactions with students in classroom learning conversations, and for this reason the focus was on teacher-student interactions. Although student-student interactions, students' individual learning and behavioural needs, and accountability issues were considered when interpreting data, they were not the focus of the study.

4.5 Specific methods of data collection

The specific data collection methods used in this study included semi-structured interviews to ascertain the ways in which the participating teachers conceptualised their pedagogical content knowledge, audio recording of teacher reflection days, observational fieldnotes, audio recording of classroom conversations, and reflective diaries.

4.5.1 Semi-structured interviews

In the present study I used semi-structured interviews to gather information about the ways in which the participating teachers conceptualised their pedagogical content knowledge and classroom practice. Both teachers were asked the same basic open-ended questions, the wording and sequence of which were fixed in advance. However the semi-structured nature of the interviews enabled me to ask extra discretionary questions to gain more detailed information, or when necessary, to pursue a point

when an interviewee digressed from the topic.

The teachers were interviewed once, separately, at the beginning of Cycle One, to obtain baseline data concerning their knowledge, thinking, and beliefs about teaching and learning. Information concerning the development of the teachers' knowledge, thinking, and beliefs as the research progressed was obtained by recording and analysing the discussion that occurred during the reflection days at the end of each cycle.

Each interview took approximately 45 minutes. The interviews took place at the school, outside teaching hours, at a time prearranged with each teacher. This was to ensure that that the interviews caused the least possible disruption to the teachers' time, and interfered as little as possible with their daily routines. A quiet, private office was used as the interview site. Both interviews began with informal conversation to put the participants at ease. The interview questions (Appendix G) investigated the participants' educational backgrounds and teaching experience, and their knowledge and attitudes about the influence and importance of teacher subject content knowledge, learning theory, and formative assessment. With the consent of the participants I recorded and personally transcribed each interview. The recording procedures used are discussed later in this chapter.

4.5.2 Reflection days

At the end of each cycle I arranged for the participating teachers to be released from their classroom responsibilities for an entire school day in order to participate in a "reflection day." These were held off-site, in a meeting room at my place of employment. Funding for the required relieving teachers came from a research grant from my employer. During the first half of each reflection day we compared and discussed previously coded transcripts of the observed lessons (see Chapter 5, Section 5.2.3). The analysis and discussion assisted the teachers in developing their understanding of their own practice. In order to assist the teachers to develop skills in self-reflection I acted as a critical friend, encouraging them to reflect individually and together on their lesson transcripts. I acted as a sounding board against which they developed ideas for further action, planned strategies for change, and monitored the

effects of any changes that occurred. Each reflection day was recorded in its entirety (with the teachers' consent), providing valuable verbatim data concerning the development and change that occurred in the teachers' thinking as a result of the action research process.

4.5.3 Observational fieldnotes

The present study involved twenty-one observations in each classroom, conducted over the duration of the four cycles of research. I observed learning conversations from an unobtrusive position in each classroom. Observer effects were minimised by trialing the observations in each classroom, partly to streamline the procedures and use of equipment, but also to familiarise the teachers and students with the process. To ensure accuracy I audio recorded each session and took extensive fieldnotes.

Observational fieldnotes (excerpt provided in Appendix H) were written over each period of observation. The fieldnotes were in the form of a running record of everything that happened during my time at the school, including conversations with the participants, continuous running commentaries of observed lessons, detailed descriptions, and verbatim comments from the teachers and students. They included my personal thoughts and reflections about incidents that occurred and the evidence being collected. I also noted problems, issues, and emerging trends concerning the processes of data collection and reflection as I became aware of them. The parts pertaining to individual classroom observations were verified and discussed with the teachers and students concerned.

4.5.4 Audio recording

With the informed consent of the participating teachers and students I audio recorded the interviews, classroom observations, and reflection days in their entirety. For the interviews and reflection days a high quality portable recording device was placed on the table near the teachers, and for the observed lessons they wore the same device on a cord around their necks. This was unobtrusive, and provided the best possible clarity of recording. The recordings ensured accurate documentation of the teacher-student interactions in classroom learning conversations. Although non-verbal behavior such

as body language or facial expressions could not be recorded, tone of voice, inflection, expression, and volume, all provided valuable information to assist with interpretation.

In the present study, because I had been present during the recording and was able to match the recordings with the written running records of the observed lessons, I personally transcribed the tapes of the recorded lessons to ensure the most consistent interpretation possible.

4.5.5 Reflective journals

During Cycles Three and Four the teachers volunteered to keep reflective journals in which they recorded their actions, reactions, feelings, explanations, and reflections in relation to both their classroom practice, and to the readings that I had provided. The diaries were invaluable during the reflection days in assisting the teachers to reconstruct events retrospectively. The entries varied in length and detail, but were generally quite brief. The teachers were assured that their journal entries were confidential and that they were not required to share them. However, both teachers were happy to share what they had written as part of the research process, and at the end of the study offered them to me to assist in writing up the research. An excerpt from Anne's reflective journal is provided in Appendix I.

4.6 Data analysis

Data in this study were analysed both during and at the end of each cycle. The interview transcripts were reviewed and discussed with the participating teachers. The teachers' responses to the interview questions were sorted and summarised in tabular form (see Chapter 5, Section 5.1). Notes or questions were added in relation to what appeared to be important or interesting. Some of this information was then used when conducting subsequent fieldwork.

I personally reviewed the fieldnotes and transcribed and coded the recordings of the observed lessons as soon as possible after leaving the field, while events were still

fresh in my mind. This allowed me to feed material back to the teachers as quickly as possible, in order to facilitate the reflective process. The teachers were given copies of the transcripts, which they also analysed and coded.

Analysis of the data involved reviewing the transcripts and fieldnotes and sorting and categorizing the teachers' utterances in relation to patterns or themes. Some of the categories developed out of this study (inductive analysis), and others were derived from previous research in the area of classroom discourse, formative assessment, questioning, and feedback (deductive analysis). The actual processes used are explained in more detail in Chapter Five (Section 5.2.3).

The study generated mainly qualitative data, much of which is reported in verbatim form. The categorised teacher utterances were also analysed quantitatively (into percentages) and organised into a framework, to enable us to make comparisons across cycles and monitor changes in the teachers' practice. Percentages were used because there were more observations in Cycle One than in subsequent cycles, and because the observed lessons varied in length and in the amount of teacher talk. The processes used are explained in more detail in Chapter Five (Section 5.2.3).

4.6.1 Triangulation

In the present study triangulation was used to bring together the different types of evidence collected from the teacher interviews, the observational fieldnotes, the observation transcripts, and the teachers' reflective journals. The different sets of data were compared and discussed during the reflection days in order to verify the interpretations. The teachers' interview responses were verified against the information from the observation transcripts. The observational fieldnotes and the teachers' reflective diaries were also checked against the observation transcripts. In addition, the information from each cycle was compared with that from other cycles to monitor consistency of interpretation. The perceptions of each member of the group were tested against one another in frank and open discussion during the teacher reflection days at the end of each cycle. Examining issues from "different angles" (Kember, 2000) assisted group members to develop greater depth of understanding, and enabled us to negotiate and resolve the few points of disagreement that arose.

4.7 A brief overview of the four cycles of action research

After receiving informed consent from the Principal and Board of Trustees, from all of the participants, and from the parents and caregivers of the students, the research was able to proceed. The first cycle of action research began in Term Three, 2003. The research was conducted in four cycles over a period of nearly two years.

Because I had initiated the study as the outside facilitator, the first cycle of the action research was planned in advance, and was guided by the original research questions. Cycle One comprised:

- The original series of research *questions,*
- Teacher *interviews* ,
- *Observation, recording, and analysis* of classroom interactions,
- A *teacher reflection day* during which both the findings and the research process were discussed and reflected upon, and ending with
- a series of *new questions* to drive the next cycle.

Because action research is by nature evolving, each subsequent cycle was planned jointly by the research group in response to the outcomes of the previous cycle. The subsequent cycles followed the same pattern as Cycle One, without the teacher interviews, although the final cycle ended with a set of conclusions rather than with further questions.

The process and findings of each of the four cycles of action research are described in detail in the following four chapters of this thesis, Chapters Five to Eight. Chapter Nine contains an in-depth discussion of the overall findings of the four cycles of research, along with implications for teacher education and development.

CHAPTER FIVE

CYCLE ONE: TERM THREE 2003

I'm so embarrassed, I use so much slang, and I don't finish sentences. I hardly ever speak in proper sentences! (Anne: Reflection Day, Cycle One)

I can't believe how much I talk. Look at this! A whole page! … And another one. Those poor kids, having to sit and listen! (Ruth: Reflection Day, Cycle One)

The first action research cycle, which took place in Term Four, 2003, was primarily a second order inquiry, which I had initiated as an outside facilitator. The first two of the original five research questions guided this cycle, namely:

- How do teachers conceptualise their pedagogical content knowledge?
- What factors influence the quality of learning conversations in classrooms?

In Cycle One, I collected baseline data that could be compared with data from subsequent cycles, to monitor the effects of the action research process on the teachers' professional development. The other original research questions, which investigated the effects of the professional development on teachers' thinking and practice, are addressed in the next three cycles. Although the study was largely researcher driven in Cycle One, subsequent chapters will show that there was a gradual shift towards a first order inquiry as we progressed through the four cycles of action research. As Anne and Ruth became aware of the opportunities for reflection and professional development provided by the research process, the locus of control gradually shifted from me as the outside facilitator to the point where control was shared. As the teachers' confidence developed they began to generate and answer questions of their own.

This chapter provides a detailed account of the process and findings of the first action research cycle. The chapter follows through the series of steps outlined in the previous chapter, which began with the original research questions. Information generated from the teacher interviews is presented, along with the findings from the classroom observations, the outcomes of the teacher reflection day, and my own reflections on the research process and findings. The chapter concludes with a new series of questions to be investigated in the next cycle of research.

5.1 Teacher interviews

The research process began with the teacher interviews, which were intended to serve a twofold purpose. Primarily, the semi-structured interviews were designed to investigate the ways in which Anne and Ruth conceptualised their pedagogical content knowledge. In addition, I expected that the questions would stimulate the teachers' thinking about their own classroom practice, introducing them to, or reminding them of, discourse and concepts related to learning theory and formative assessment.

Analysis of the teachers' responses resulted in the following categories of data; emphasis placed on content knowledge, conceptualisation of the use of pedagogical content knowledge, personal theories of learning, understanding of formative assessment, and provision of feedback to learners. A discussion of the teachers' responses to the interview questions follows (see Table 5.1, p. 79). Although the intention of this study was not to compare the teachers, to avoid replication, their responses are presented side-by-side in the same table.

Table 5.1: Summary of teacher responses to basic interview questions

Interview question	Anne	Ruth
How important is content knowledge?	Really important. You have to know what you're talking about, to be able to answer questions.	Very important. I like to know what I'm talking about. It's hard in subjects that you aren't so well versed in.
What are your strongest subject areas?	Music, Social Studies, Language	English [Written Language], The Arts [Dance, Drama, Music]
What do you do when unsure of content knowledge?	Research - internet, library books, school journals –*always* have to do research	Research – school resources first, then library, then internet -can't be five minutes before lesson.
How do you make material understandable for learners?	Language, a lot of oral and visual language. Discussion. Questioning. Build up vocabulary. Revisiting different perspectives. Scaffolding.	Take it right back to something basic. Draw diagrams. Make it as simple as possible. Give examples. Role-play. Scaffold.
What do you understand the term "scaffolding" to mean?	Supporting children's learning. Addressing gaps in their knowledge.	Help children along. Start them where they were and take them somewhere else.
What ideas about learning influence the way you teach? **What learning theory are you familiar with?**	Happens in a variety of ways. Don't believe it happens in silence. Discussion, sharing ideas, then some quiet time alone to clarify/consolidate thinking None really. I vaguely remember stuff about Piaget, from teacher training.	Needs to be enjoyable. Providing environment, hands on, using all the senses. Building on prior knowledge. Child directed – tangents all the time. Not chalk and talk. Hazy recollection of Piaget's stages? Readiness? That's about it though.
What is your philosophy of teaching?	Children all at different stages. Lead them from where they are. No right or wrong. Help children along with tools. Work alongside. Positive environment. Children should feel comfortable, but challenged.	All children should be safe and happy. Create lifelong learning, wanting to know attitude. Giving them skills and attributes for lifelong problem solving.
What do you think formative assessment involves? **How do you use it in your classroom?**	Observation of daily learning – not necessarily recorded. Knowing where children are at through what they do, how they respond and interact. Ongoing, every aspect of learning and development. Conferencing [group, individual], daily where possible. On the spot, mark work *with* them. Addressing needs.	Making a decision about what children need to know, or where they need to go, from what I've just seen them do. Not written down. Act on it immediately. Might not be right on the spot, might be next day. Change activity so that they understand. Move on from where they were.
What kind of feedback do you find is useful for learners?	Direct feedback, oral and written. Telling what they're doing well, what they need to look at to move forward.	Confirmation they're doing well. Immediate guidance if they're on the wrong track. Go back to where problems started and set them straight.

5.1.1 Emphasis placed on content knowledge

Both Anne and Ruth stated that they considered content knowledge to be very important, and that they made a point of ensuring that their content knowledge was sufficient to allow them to confidently approach every teaching session. As part of the process of planning each unit of work they expected, as a matter of course, to spend some time researching the topic.

> *Anne: Looking up books, and recently the internet, the library, … I **always** have to do research, even if we've done the topic before. … school journals … there's some wonderful content in those.*

> *Ruth: You have to research it, and it can't be five minutes before … I'll try the school resources first … if that's not suitable I'll try the local library … my last resort would probably be the internet … I find fathoming my way through that quite arduous … I'd mostly choose books on the subject written for children because they're easier for me to read … rather than adult books.*

Ruth's reference to the use of children's books because they were easier for her to read, along with Anne's use of school journals as reference material, indicated a lack of depth in the teachers' personal research. When questioned about this, they both gave expedience as their reason, citing time constraints, and the accessibility of the school library and reading resources. They agreed that this was somewhat inconsistent with their stated belief in the importance of content knowledge.

When the teachers were asked what they do when they find themselves out of their depth in terms of content knowledge, such as when a student asks a question that they are unable to answer, both teachers said that they admit their lack of knowledge to the class and involve the students in investigating the topic. These responses were consistent with the evidence from classroom observations.

5.1.2 Conceptualisation of the use of pedagogical content knowledge

There were differences between the ways in which the two teachers' conceptualised their use of pedagogical content knowledge that I later found to be consistent with the differences in their pedagogy or "teaching styles." Anne talked about her use of questioning.

> *Anne: It's redirection, and revisiting through a different perspective. … I guess it's just scaffolding. … It's really a case of coming in from another angle, working out what they do know. … You've got to try many ways of questioning to actually lead them to what you want them to understand. Individually it's just a case of working one to one and asking lots of questions. I use the markers* [who, how, what, why, when, where] *all the time.*

Ruth described her use of role play.

> *Ruth: I'll give them as many examples as I can. … It happens all the time when you're teaching. Something will pop into your head and you'll think, "Oh well, I'll use that as an example." You'll do a bit of role play and say "This is how it works" … "You be such and such, and you be so and so, and I'll be whoever,"… and I'll be the instigator of what I want them to see, and the children will just all role play around me. I scaffold it, I think, I take it right back.*

While both teachers used the term scaffolding, neither had any formal conception of its true meaning, nor had they heard of Vygotsky or Bruner. Both teachers believed the term to be interchangeable with "help" or "support," and building upon what students already know, but were unable to be more specific about what form it might take. It was apparent that they had both acquired the term informally with only a vague idea of its origin or theoretical significance. Anne could not recall where she had first heard the term, and Ruth referred to it as "just jargon" that a social studies lecturer had used. When I questioned Ruth further it was apparent that the lecturer had used the term with the assumption that her students (all practicing teachers) understood what it meant.

5.1.3 Personal theories of learning

Neither Anne nor Ruth was able to articulate any knowledge of formal learning theory. This was of some concern, but was not surprising in the light of relevant literature (e.g., Darling-Hammond, 2000a, 2000b; Dufficy, 2005; Harnett, 1999; Wasley, 1999). However, both teachers' conceptions of learning contained elements of both individual and social constructivist learning theory. Although she was not familiar with the work of Vygotsky, Anne's personal understandings about teaching and learning were predominantly consistent with the assumptions underpinning social constructivist theory. She made reference to assessment of prior knowledge, and the use of language, discussion, and the sharing of ideas.

> *Anne: Give children the information through … language-based activities where they have the chance to speak about things, discuss stuff and draw their own conclusions, before they're actually required to apply what they've learnt. … Always I'm trying to find out what they do understand … through questioning … connected to … new information. … I really don't believe that much learning happens in silence. When we've done the discussion, when they've had a chance to share ideas, and they've clarified their thinking, … and then they're ready to write, I do require silence. That's the actual clarifying part of their thinking.*

The allowance for time for children to clarify their thinking and to draw personal conclusions in silence is consistent with Vygotsky's (1978) notion of internalisation.

Ruth's ideas about learning were mainly consistent with those of personal constructivism, although she was unfamiliar with the term. She did have a "hazy recollection" of Piaget's stages of development and the notion of readiness. She saw the role of the teacher as a facilitator who provides the environment for learning to "happen." She talked about the fact that the children often "directed" the flow of teaching and learning, with lessons going off on "tangents" to fill gaps in their understanding. Ruth also mentioned the importance of prior knowledge.

Ruth: They have to … make decisions for themselves. … Just by providing the environment in which learning can happen, … so it needs to be hands on, using all the senses. … It's not chalk and talk in my room, that's for sure. Sometimes the children direct where we're going. There's an awful lot of tangents all the time. … I just take the children back to where they are. There's no point in starting halfway up the road when you need to be at the beginning of it.

5.1.4 Understanding of formative assessment

The teachers described formative assessment as an informal, and generally unrecorded process, of conferencing with or talking to children as a customary part of their teaching. They both talked about *using* or acting on the information from formative assessment by making immediate adjustments to their teaching.

Anne: By conferencing with the children, daily, where I can of course. I don't see everybody every day, for everything, that would be unrealistic. … Group conferences, individual conferences, in different areas, and … observation. Just … sometimes I put things … down in the workplan, … so that it keeps reminding me of who's where, or if there's desperate needs or whatever … things that need to be addressed. … It's better to work alongside with them so you can get them to actually see any gaps and address it straight away.

Ruth: I wouldn't write it down … if I noticed something about what a child is doing, … but I would act on it as immediately as I could. It might be right on the spot or it might not be, but it might be in the next day's activity. I may change that activity for that child, or however I approached it, so they were able to understand, and move on from where they were.

5.1.5 Provision of feedback to learners

Both teachers discussed providing immediate feedback, in response to children's needs.

*Anne: Usually you try to do it **with** them rather than later. … Help them move on to the next stage.*

Ruth: They've written something … and you read it and you think "Crikey! That's a bit confused," or "I don't know what you're on about!" So you have to question them and find out what they're thinking in order for you to help them with that issue, or problem.

Both Anne and Ruth described providing information to learners to assist them to close the gap between current and desired performance (Sadler, 1989). In accordance with Tunstall and Gipps' (1996) work on the provision of feedback to young children, both teachers talked about the use of descriptive feedback, telling children what they are doing well (constructing achievement), and what they need to do to improve (constructing the way forward).

Anne: Direct feedback, both oral and written. Telling them what they can manage, what they're doing well, and what they need to look at to move forward.

Ruth: Just confirmation that they're doing well. That they're on the right track, or immediate guidance putting them on the right track if they're heading off on the wrong tangent. … If the child could handle it I'd first of all say how wonderful this work is, … could you think of any way to improve it? … Perhaps some descriptive words here, or more of a twist at the end? Could we change that around to make it more interesting?

5.1.6 Conclusions

The interviews provided baseline information regarding the teachers' conceptualisation of their pedagogical content knowledge. As expected, the questions also stimulated the teachers' thinking about their classroom practice. Although neither Anne nor Ruth had been able to recall any knowledge of learning theory, they had been able to articulate their personal beliefs about teaching and learning. The observations that followed would provide information as to whether the teachers' espoused theories matched their theories-in-use (Argyris & Schon, 1974; Kemmis & McTaggart, 2000), or whether what they *said* about their practice matched what they actually *did*.

5.2 Classroom observations

During Cycle One I observed, made field-notes, and recorded six one-hour English lessons in each of the two Year 5 and 6 classrooms. We arranged that I would arrive at the school at approximately 8.15 a.m. each Tuesday. This was to allow time for a brief meeting with Anne and Ruth, to re-establish contact each time, and over the duration of the study to build up a relationship of trust and collegiality as a research team. I also spent morning interval in the staff room with one or both participants. Anne and Ruth undertook the precise timetabling of when I was to observe in each classroom.

After each classroom observation I transcribed the recording and provided the teacher with a copy. I analysed the fieldnotes and observation transcripts of the learning conversations in each classroom. In order to involve the teachers in the research process and to prompt reflective thinking on their part, I initially asked them to read through copies of their transcripts and to take note of what *they* perceived to be influencing the quality of their interactions during learning conversations with students. I also asked them to note aspects of their teaching practice that interested, surprised, or concerned them.

This section of the chapter provides baseline information on the following; the effects of an observer presence in the classrooms, the development of a framework of categories of interactions to assist the teachers to critique and reflect upon their practice, the categorisation of teacher utterances according to the framework, the pedagogical styles of the two teachers, the teachers' expectations for student achievement, and the number of interruptions to the teaching programme related to behaviour management and school administration.

5.2.1 Effects of an observer presence

Before embarking on the formal observations I spent twenty minutes, on three separate occasions in each classroom, to trial the use of the audio recorder and to practise taking

fieldnotes. This enabled me to test the sound range of the recorder, and allowed the teachers and the children to adjust to the experience of being observed and recorded. During the observations I sat in an unobtrusive place in the classrooms, and recorded fieldnotes throughout the session. I asked the teachers to use the children's names as much as possible at the beginning to assist me with transcribing the recordings, but apart from that to "be themselves." The recorder aroused some mild curiosity from the children, who appeared to adjust quickly to the situation, but both teachers were more self-conscious.

> ***20.05.03 (Cycle 1/Fieldnotes 1)***
> *Both Anne and Ruth are somewhat self-conscious about having the recorder hanging around their necks. I keep reassuring them, and reminding them that they are the experts in their own classrooms, and that this is more for them to learn about themselves than it is for me to learn about them.*

Self-consciousness was initially more of a problem for Ruth. However, as a result of the feedback provided after the first observation, and after reading her first transcript, she became much more relaxed and open. As her understanding of the possibilities of the research developed, she became more confident, trusting, and involved.

> ***29.07.03 (Cycle 1/Fieldnotes 3)***
> *In Ruth's room at 10.00. She is really comfortable with recording now. Reading the transcript of her previous lesson, which was extremely powerful, has developed her confidence in her skill as a teacher. She has "blossomed" from being the more diffident participant to being very relaxed.*

However, Anne's self-consciousness continued for several sessions.

> ***29.07.03 (Cycle 1/Fieldnotes 3)***
> *Arrived at school at 8.30. Observing in Anne's room first. Anne is still rather self-conscious about the recorder around her neck … At the end of the lesson Anne expresses her concern about her self-consciousness, and the fact that we are recording segments that aren't the "real" teaching and learning part of her lesson. I reassure her that our focus/analysis is the teaching and learning, and that the rest may prove useful to her.*

> ***12.08.03 (Cycle 1/Fieldnotes 5)***
> *Today Anne is going to turn the recorder on at the time that she begins roving conferences, as she feels that this is the time that she does the most "real" teaching.*

As we progressed through the cycle Anne began to see the observations as opportunities for professional development and she became progressively more relaxed and more involved in the research process. Every effort was made to make the observation procedures as relaxed and unobtrusive as possible in order to reduce the effects of an observer presence. However it was not possible to ascertain the extent to which the pedagogy of the teachers or the responses of the children were influenced by the observation and recording of the lessons.

5.2.2 Development of a Hierarchy of Classroom Interactions

During Cycle One my informal discussions with Anne and Ruth revealed that they were responding to the transcripts of their teaching in a very superficial manner. They were focusing mainly on grammar and who was doing the talking, rather than on what was being said and its relationship to learning. This led me to conclude that the teachers needed a "framework" to guide them in analysing their interactions with students. Through analysis of what I was finding in the transcripts, and with reference to relevant literature (e.g., Black, Harrison, Lee, Marshall, & Wiliam, 2002; Bloom, 1956; Mercer, 1995; Tunstall & Gipps, 1996; Wiliam, 1999; Wilson, Shulman, & Richert, 1987; Young, 1992), I developed the basis of a three-tiered hypothetical framework of all teacher-student interactions (with individuals, groups, and the whole class). During the cycle I met with Anne and Ruth to introduce the rudimentary framework. We discussed how the different types of teacher utterances in their transcripts fitted into the framework and negotiated mutually acceptable descriptive terms for each. In this way we were able to work together to refine the framework into a structure that made sense to us all. The end result was a "Hierarchy of Classroom Interactions" (Table 5.2, p. 88). Within the hierarchy are three levels of interaction, management of the classroom, management of the lesson, and management of the learning.

Table 5.2: Hierarchy of Classroom Interactions

HIERARCHY OF CLASSROOM INTERACTIONS		
LEVEL ONE: MANAGING THE CLASSROOM		
Administration Routine	Managing behaviour	Personal /Humorous
LEVEL TWO: MANAGING THE LESSON		
Imparting information	**Closed questions**	**Dead-end feedback**
Framing Linking Recapping Motivating Directing Instructing Telling	Cueing Establishing prior knowledge	Confirming Praising Repeating Negating
LEVEL THREE: MANAGING THE LEARNING		
Constructing understanding	**Open questions**	**Feedforward**
Explaining Connecting Acknowledging	Inferential Extending Challenging Metacognitive	Correcting Clarifying Elaborating Transferring

The purpose of the hierarchy was to assist the teachers to critique and reflect upon their practice by focusing their attention on the "teacher talk," questioning, and feedback in their transcripts. The terms, or categories, of utterances used are peculiar to this study and were not intended to be used in any other context. A glossary of the terms used in the Hierarchy of Classroom Interactions is provided in Appendix J, and excerpts from analysed observation transcripts are provided in Appendix K.

Level One: Managing the classroom

The first level of the Hierarchy of Classroom Interactions is concerned with managing the classroom. Interactions at this level involve;

- administrative procedures and routines,
- behaviour management,
- and the development of relationships and rapport with students.

Before effective teaching and learning can occur, there is a need for order in the classroom. This is achieved through the development of effective organisation and

routines, and the establishment of positive relationships between the teacher and the students. However, Wilson, Shulman, and Richert (1987) have suggested that in some primary school classrooms the teaching of subject matter may be subordinate to and contingent upon the establishment and maintenance of organisational and socialisation goals. They suggest that in such cases valuable classroom time is often spent dealing with administrative, organisational, social, pastoral, and behaviour management issues at the expense of teaching and learning.

Level Two: Managing the Lesson

The second level of the Hierarchy of Classroom Interactions is concerned with managing the lesson. Interactions at Level Two involve;

- imparting information and giving instructions,
- establishing prior knowledge through the use of closed questions,
- and responding to students without attempting to alter their thinking in any way ("dead-end feedback").

As discussed in Chapter Two, previous analyses of classroom discourse have revealed that many classroom interactions are more concerned with managing the flow of lessons than with real teaching and learning (Mercer, 1995; Pressley & McCormick, 1995; Torrance & Pryor, 1998; Young, 1992). Pressley and McCormick (1995) believe that teachers often formulate low-level closed questions that are literal and factual in nature to guide their lessons in particular directions. These are what Young (1992) has labelled What Do Pupils Know questions, and Guess What Teacher Thinks questions. Mercer (1995) also claims that teachers use certain common techniques to guide the learning activity in a particular direction. Feedback at this level does not develop students' understanding or contribute to further learning. Accordingly, we have used the term "dead-end feedback" for Level Two feedback.

Level Three: Managing the Learning

The third level of the hierarchy, named "Managing the Learning," is concerned with teaching and learning interactions that promote deep learning by developing, augmenting,

refining, and altering students' thinking. This is where the real mediation of learning occurs. Interactions at this level involve;

- constructing students' understanding,
- open-ended questioning to ascertain students' understanding and develop their thinking,
- and "feedforward," or "where to next" feedback

Deep learning is constructed collaboratively through conversations that involve thought-provoking questions, explanation of relationships, elaboration of conflict, construction of reasoning, and correction of incorrect propositions (van Boxtel, van der Linden, & Kanselaar, 2000). This requires teachers to have skill in interacting with learners and sufficient content knowledge to engage with the material under discussion (Jordan, 2004). Conversations of this nature are based on a common focus of reasoning and understanding. Questions at this level are open questions, to find out what students are really thinking and to ascertain the true depth of their understanding. Young (1992) labelled questions of this type "What Do You Think?" questions. Such questions also serve to extend and challenge students' thinking. Feedback at this level is used to provide information to learners to assist them to close the gap between current and desired performance (Sadler, 1989). This involves descriptive feedback that "constructs the way forward" by making it clear what learners need to know or do to improve (Tunstall & Gipps, 1996). For this reason we have used the term "feedforward" to describe Level Three feedback.

5.2.3 Categorisation of teacher utterances

Prior to the reflection day at the end of each cycle we carefully read, analysed, and coded each lesson transcript according to the Hierarchy of Classroom Interactions. I coded all of the transcripts, and in addition, each teacher coded her own. Because the focus of the study was on the behaviour of the teachers, we categorised only the teachers' utterances, while taking student responses into account. Although the teachers' interactions with individual students were identifiable in the transcripts, the students' utterances were not categorised. Coding involved highlighting every teacher utterance with a coloured marker according to what we considered to be the appropriate *level* of the hierarchy (Level One,

Yellow; Level Two, Green; and Level Three, Pink). We also placed an abbreviation for each assigned *category* in the margin of the page. During the reflection days we compared and cross checked each other's coding (for inter-coder reliability), and discussed any discrepancies that had occurred. On the few occasions that we were unable to reach a consensus, the coding assigned by the teacher was applied. Excerpts from analysed transcripts that illustrate the method of coding are provided in Appendix K.

We used the Hierarchy of Classroom Interactions to develop quantitative data to enable us to track changes in teacher-student interactions across cycles. Because the observed lessons varied in number, in length, and in the amount of teacher talk, raw data would have been meaningless for comparing teacher utterances from cycle to cycle. For that reason we analysed the data into percentages (rounded to two decimal points). We firstly calculated the total number of each teacher's utterances in all of her transcripts in each cycle, and then calculated the utterances in each category as a percentage of the total. Keeping the analysis simple was consistent with action research principles, in making the data more accessible to the participating teachers. The use of rounded percentages enabled the teachers to readily compare their proportions of utterances within and across the four cycles of research. This assisted them in analysing and monitoring changes in their learning conversations, and in deepening their ability to reflect on their practice.

In the chapters that report on the findings of this study (Chapters 5-8), the presentation of data is in the same format that we developed for use in the action research process. This format simplified the representation of the data in order to assist the participating teachers in their analyses. To avoid replication, although there was no intention to compare the two teachers, data for each teacher are presented side-by-side within each table. The percentages of teacher utterances in each category and level of the Hierarchy of Classroom Interactions in Cycle One are summarised in Table 5.3 (p. 92).

Table 5.3: Categorisation of teacher utterances in Cycle One*

LEVEL ONE: MANAGING THE CLASSROOM								
******	**A**	**R**		**A**	**R**		**A**	**R**
Administration	4.63	3.22	Managing			Personal /		
Routines	1.03	0.00	behaviour	6.94	0.76	Humorous	0.77	3.79
Sub-totals*	**5.66**	**3.22**		**6.94**	**0.76**		**0.77**	**3.79**
Total Level 1*	**Anne: 13.37**			**Ruth: 7.77**				
LEVEL TWO: MANAGING THE LESSON								
Imparting information			**Closed questions**			**Dead-end feedback**		
******	**A**	**R**		**A**	**R**		**A**	**R**
Framing	1.28	2.84	Cueing	13.11	3.79	Confirming	9.77	9.47
Linking	0.51	0.95	Establishing			Praising	6.94	13.07
Recapping	1.54	0.38	prior			Repeating	11.83	12.87
Motivating	0.00	1.70	knowledge	5.14	10.98	Negating	0.00	1.70
Directing	2.83	0.76						
Instructing	8.23	5.30						
Telling	5.91	8.33						
Sub-totals*	**20.30**	**20.26**		**18.25**	**14.77**		**28.54**	**37.11**
Total Level 2*	**Anne: 67.09**			**Ruth: 72.14**				
LEVEL THREE: MANAGING THE LEARNING								
Constructing understanding			**Open questions**			**Feedforward**		
******	**A**	**R**		**A**	**R**		**A**	**R**
Explaining	5.66	5.87	Inferential	4.88	2.65	Correcting	2.06	1.52
Connecting	0.26	0.38	Extending	0.26	1.52	Clarifying	3.08	2.84
Acknowledging	0.26	0.57	Challenging	0.51	1.52	Elaborating	1.80	2.27
			Metacognitive	0.51	0.76	Transferring	0.26	0.19
Sub-totals*	**6.18**	**6.82**		**6.16**	**6.45**		**7.20**	**6.82**
Total Level 3*	**Anne: 19.54**			**Ruth: 20.09**				
TOTAL*	**Anne: 100.00**			**Ruth: 100.00**				
Total number of utterances	**Anne: 389.00**			**Ruth: 528.00**				

*** Expressed as percentages of total utterances for each teacher**

**** A = Anne : R = Ruth**

The participating teachers' action research focus, or first-order inquiry, was on monitoring pedagogical change rather than on producing generalisable data. However, in

order to provide greater theoretical rigour for the second-order inquiry, which investigated the effects of the action research process on the teachers' knowledge and thinking, and on the quality of their classroom learning conversations, some further analysis was required. As previously mentioned, the raw data generated in this study was not suitable for making comparisons, nor was it suitable for calculating statistical significance. However, at the end of Cycle Four I compared the baseline data from Cycle One with the data from Cycle Four, calculating effect sizes in order to determine the *practical significance* of the professional development process. These calculations are presented in Chapter Eight (Refer Section 8.2, p. 169).

Utterances at Level One

As summarised in Table 5.1 (p. 92), in Cycle One we found that both teachers used interactions at this level (Anne, 13.37%; Ruth, 7.77%) to deal with administrative matters, to establish and maintain routines, to encourage appropriate behaviour and to manage misbehaviour. Interactions of this nature took place quite frequently in Anne's room, where there were several students with behavioural difficulties.

> ***05.08.03 (Cycle1/Observation Transcript/A/2)***
> *Anne: You need to move, because you're actually distracting this person and all the ones around you. Stand up please and go and sit beside C, … he's a good listener. … Look at all those people … people with good listening skills in place.*

In their interactions at Level One the teachers demonstrated many different qualities, including authority, empathy, and humour, in order to develop rapport with students, and to maintain an effective teacher presence.

> ***20.07.03 (Cycle 1/Observation Transcript/R/2)***
> *Ruth: Yes. A girl chooses a partner with a boy to do this exercise. I can already see some of you squirming. What's the most important thing to remember about this? You don't have to **marry** them! You just have to do the activity. You don't even have to **like** them, but you do have to speak and communicate.*

In addition there were a number of interruptions to class time that were generated by the school administration, and hence beyond the teachers' control, that both teachers considered to be time-wasting. These interruptions to teaching time are discussed in more detail in Section 5.2.6.

Utterances at Level Two

In the transcripts we found that the greatest proportion of teacher utterances in both classrooms (Anne, 67.09%; Ruth, 72.14%) were associated with managing the lesson. In Level Two the teachers articulated previous shared experiences, or we statements (Mercer, 1995), in which they framed their lessons.

29.07.03 (Cycle 1/Observation Transcript/R/2)
Ruth: O.K. kids … we're going to be talking this morning about … sorts of words.

They also issued instructions such as:

20.07.03 (Cycle 1/Observation Transcript/A/1)
Anne: Cast your eyes up to the orange paper, … and I want you to put up your hand and tell me what might be the picture we are looking at.

The teachers established what students already knew or understood through the use of closed questions.

29.07.03 (Cycle 1/Observation Transcript/A/1)
Anne: Who are these people?
N: Two jugglers?
Anne: Any other people that you saw that made it a very special day?

They also responded to what students had to say without attempting to alter their thinking in any way.

27.05.03 (Cycle 1/Observation Transcript/R/1)
Ruth: Just by looking at the top picture, can you tell me what this might be about?
K: A jail?
Ruth: A jail! Good boy! … What's on the windows that makes you think that?

K: *Bars.*
Ruth: *Bars on the windows!*

Although the majority of interactions in their transcripts involved the management of their lessons rather than the development of students' thinking, neither teacher saw this as a cause for concern at this stage.

Utterances at Level Three

A much lower proportion of teacher-student interactions (Anne, 19.54%; Ruth, 20.09%) occurred at Level Three than at Level Two. At this stage in the study the teachers did not see this as a cause for concern. The Level Three open questions that the teachers did use in this cycle included inferential questions such as:

29.07.03 (Cycle 1/Observation Transcripy/A/1)
Anne: *Why did the journalist choose that for a title? Britomart goes public? … J, what do you think?*

They also asked questions that encouraged students to use metacognitive skills.

29.07.03(Cycle 1/Observation Transcript/R/2)
Ruth: *How did you know not to say Susan read* [present tense] *a book about dinosaurs?*
M: *Because it didn't make sense.*
Ruth: *So you'd already pre-read that? … Or were you making that decision as you went along?*

The following is an example of feedforward in which Ruth attempted to extend a student's thinking:

27.05.03 (Cycle 1/Observation Transcript/R/1)
Ruth: *Not what they're* ***doing****. I don't want to know what they're* ***doing*** *K. No. I want you to tell me if you know, or can have a guess, what that thing with a big ball on the end of it, and an anklet, is actually for.*

Sometimes the teachers acknowledged something that a student said that had contributed to the teacher's own personal knowledge, for example:

29.07.0.3 (Cycle 1/Observation Transcript/R/2)
*Ruth: Oh **really**? I've learned something today!*

5.2.4 "Teaching styles"

From the beginning it became apparent that the teachers had very distinct, and different, "teaching styles." Ruth's wry sense of humour was always in evidence. She tended to talk a great deal, with much enthusing to motivate children's interest, and she frequently role-played to bring content to life for the children.

27.05.03 (Cycle 1/Fieldnotes 2)
Ruth reads through a poem with the children – it is written in 19th century English and is about convicts in Brisbane. The language is not particularly accessible. Ruth constantly interrupts the reading of the poem to explain vocabulary. … At the end of the discussion Ruth plays a professionally recorded rendition of the poem on tape. Many of the children's faces visibly "light up" as the poem comes to life. They are particularly ecstatic when Captain Logan meets his fate. Although the vocabulary had seemed to me to be impenetrable to the children as they worked through the poem, their understanding of the complete poem at the end, when Ruth plays the recording, is astounding. They are totally absorbed, enthusiastic, and fully involved in the ensuing discussion.

Ruth's sense of humour is evident in the following excerpt, in which she attempted to develop the students' understanding of the vocabulary used in the poem.

27.05.03 (Cycle 1/Observation Transcript/R/1)
*Ruth "My back with flogging is **lacerated.**" What does it mean? … it's a big fancy word for something.*
P: Concussion
*Ruth: Oooh, no, … That's a good guess though. Not concussion P. **Lacerate!** I **love** it! Next time you do something to your finger, run into the kitchen and say, "Mum! Mum! I've **lacerated** my little finger!"*
P: Cut?
Ruth: Cut! …. We could save a lot of energy if we just used these little words, couldn't we? Think of all the ink they used when they wrote

lacerate when they just could have written cut! Why would they use the word lacerate? Rather than cut?

P: *It makes you try to figure out what the word means?*

Ruth: *Yes, it does.*

A: *It's expression.*

Ruth: *Yes. It makes you **feel** something when you read it. If you'd gone inside with a **cut** finger, Mum and Dad would probably just say "Oh, just run it under the tap." But if you run inside and say "Mum, I've **lacerated** my finger!" - they'd probably go "Oh **heavens**!" Because lacerate is a really powerful word.*

In the following excerpt from a different lesson, Ruth is attempting to extend and challenge the students' creative writing skills and their use of more interesting vocabulary.

12.08.03 (Cycle 1/Observation Transcript/R/3)

Ruth: *You are finishing this paragraph. Brian sat down. There came a point where he didn't care whether the meat was cooked, "I'm going to eat it," he thought. … So…. your next line might be "Brian carefully took the bird from the stick …" and …?*

A: *Swallowed it?*

Ruth: *Well … that would be the end of your story if he swallowed it whole.* [Laughter] *That wouldn't do justice to the fact that this is his first meat for a month, would it? … A? … No … so you've got to **elongate** it. You've got to stretch it out a bit. If the author wrote stories like that it'd be all over in one page. It would be … you know … "Brian flew through the air. The plane crashed. He had his hatchet. He killed a bird. Someone saved him, and off he went home." That would be a very uninteresting story. … What's another word you could use here?*

H: *Scoffs?*

Ruth: *He **scoffs**! Beautiful! He scoffs it! I mean he hasn't had meat in months! He **rips** the flesh off! He **shoves** it in his mouth! He chews, he **gags** because he's put so much in there. Oh man! Excellent!*

Anne is much quieter and more serious, and tended to draw information from the children through questioning. She asked inferential questions that required higher order thinking.

26/0803 (Cycle 1/Observation Transcript/A/5)

Anne: *Tell me what you found out.*

J: [Reads*] Scientists have discovered water skaters* [pond insects] *can go 50, 150 centimetres a second. … That's fast! They found it using high tech … high technology and a high-speed camera.*

Anne: Mmmm. What period of time do you think would have been that they had to do this? How long do you reckon it would have taken them?

J: It would probably have taken a couple of years.

Anne: Why do you think that?

J: Because they have to … um… make the high tech bug and they have to …um … get the cameras? And they have to research them and find some of them first.

Anne: Excellent! And would it always be the same? Would the environment these things are in always be the same?

J: Ah no! Not always.

*Anne: **How** would the conditions change? You know… Would it always be suitable for them* [scientists] *to be doing this work?*

J: No. Otherwise they [water skaters] *might die or something. If some of them die then they might become endangered if they keep on doing it.*

Anne: That's right. Good girl! Well done! You've thought about that a lot.

In addition, Anne set tasks that required the students to evaluate and synthesise information in order to extend their thinking.

29.07.03 (Cycle 1/Observation Transcript/A/1)

*Anne: So you are going to come up with your **own** idea and express **your** opinion about what could be a solution to **our** traffic problem.*

How much these differences in teaching style were a function of the differences in the composition of the two classes, and how much they were a manifestation of differences in personality, was not yet possible to ascertain. Ruth's exuberance appeared to be inspirational to her settled group of children, while Anne's serene and more measured manner appeared to have a calming influence on the more volatile personalities in her class.

5.2.5 Teacher expectations

Both Anne and Ruth subtly, but consistently, communicated high expectations and the real possibility of academic success for their students, despite their low socio-economic backgrounds and the fact that they were not always easy to motivate. In a current events based language lesson about a young Maori student who had won a scholarship to Oxford University, Anne established a connection for her students, who mainly came from ethnic minority and working class backgrounds.

> ***12.08.03 (Cycle 1/Observation Transcript/A/3)***
> *Anne: Mr. P…'s* [school caretaker, also Maori] *son went to Oxford University. He went to our school a few years ago. … He went to Auckland University, and ended up with a law degree with Honours there, and then he won a scholarship and went off to Oxford University in England, and he's just come back last year. So he achieved his goal as well. He graduated over there.*

Ruth also communicated her high expectations to her students.

> ***29.07.02 (Cycle 1/Observation Transcript/R/1)***
> *Ruth: Oh dear! Oh-oh! What do you think a verb is E…? Do you think it's a doing word, … a doing word's probably what you'd say in the junior school. What would we say in the* ***senior*** *school now? Imagine when you're at university and the lecturer stands up and says, "We're just going to be talking about* ***doing words*** *now." … I don't* ***think*** *so!* [Laughter].

5.2.6 Interruptions

<u>Behaviour Management</u>

Anne had a very difficult and unsettled class, who took a long time to settle at the beginning of each session, and there were frequent interruptions to manage off-task and disruptive behaviour. It also took a long time to restore order after interruptions, whether they were for inappropriate behaviour or for administrative purposes.

29.07.03 (Cycle 1/Fieldnotes 3)
The lesson begins at 9.15 - language/current events. Some children are rather unsettled - a new pupil (A - with a dubious reputation) has arrived this morning. It takes a long time to get the children focused and oriented to the topic - the Brittomart Railway Station.

There were a number of children with behavioural difficulties in the class, one in particular (B) who was frequently abusive towards Anne and the other children.

19.08.03 (Cycle 1/Fieldnotes 6)
In Anne's room at 9.00. The session begins with B extremely upset and physically and verbally abusive towards Anne and several children. Anne decides to physically remove him. I mark the attendance register. I feel like a student teacher, and not a particularly competent one at that – not sure how much/when to assert "authority." The experience confirms what I had already observed. This is a very difficult class.

Later in same fieldnotes
At interval Anne discusses the difficulty of the class – she refuses to be coerced into "yelling and worksheets." The result is working in an ongoing state of "flux" – a noisy environment with the whole class rarely on task at the same time.

Ruth's class had few children with behaviour problems, and consequently there were fewer interruptions which tended to be much more short lived. However, a few weeks after A's arrival at the school he was transferred from Anne's class to Ruth's, as his behaviour and manipulation of other children (B in particular) brought to light the imbalance in the make-up of the two classes.

09.09.03 (Cycle 1/Fieldnotes 8)
Arrive in Ruth's room early. A has been transferred to Ruth's room from Anne's (in recognition of an "error" in the original placement?). It is interesting to observe his manipulation of others (while he professes to be the victim of bullying) that is more readily apparent in the new environment.

<u>Administration and messages</u>

The teaching and learning sessions were frequently interrupted by school-wide administrative matters, in the form of other teachers and child messengers coming into

the classrooms, and by audio-messages over the school intercom. Both classes were regularly interrupted by the office intercom, at least once in every teaching session. Not all of these interruptions were evident in the observation transcripts, as they sometimes occurred before, and delayed the start of, the actual "lesson." Nevertheless they still reduced the learning time, on one occasion by fifteen minutes. Some examples of the interruptions that occurred are recorded in the field-notes.

> ***27.05.03 (Cycle 1/Fieldnotes 2)***
> *9.15. A language lesson in Ruth's room. The children are seated on the mat. Ruth turns off the tape recorder for an interruption from a messenger. I ask her to leave it on next time, as interruptions may prove to be significant to the study.*

> ***26.08.03 (Cycle 1/Fieldnotes 7)***
> *After interval. In Ruth's room, Ruth is working with groups - roving conferences. Interrupted by intercom message for a child to go to the office.*

The interruptions served to break the flow of lessons, affecting the depth and quality of learning conversations, as they often occurred at a crucial point in questioning or explaining. The interruptions frequently necessitated redirecting the children's attention back to the conversation, reminding them of where they had "got to," and in effect often requiring that the conversation be started all over again, particularly in Anne's classroom where the children were more easily distracted.

> ***26.08.03 (Cycle 1/Fieldnotes 7)***
> *The teaching is interrupted by a messenger just as Anne finishes giving instructions. It takes a long time to restore order. Anne eventually brings the class back to the mat to resettle and reinstate routine. She has just settled the class when they are interrupted by the intercom – requiring her to stop everything to take "sausage orders." This process takes fifteen minutes, after which, the children go back to their desks to begin work. The lesson is interrupted again by the arrival of the teacher aide. The lesson finally begins. Anne reads an article and the children circle key words on their copies – followed by a discussion. The children are to summarise the article in a form of their choice, bullet points or prose. Again interrupted by the intercom. As a result of the interruptions the lesson is very disjointed.*

09.09.03 (Cycle 1/Fieldnotes 8)
In Anne's room 9.00. The day starts with a song as always. The class is more unsettled than usual. Anne attempts to move B – she warns him that he'll be removed if he continues to interrupt. Another warning issued for four children not cooperating. The class takes a long time to settle to work, only to be interrupted by a child from another room wanting to exchange "big scissors for small.''

Both Anne and Ruth expressed their frustration at these frequent interruptions, often for trivial matters, which had in fact been the topic of discussion at a school-wide staff meeting earlier in the year. During the teacher reflection day they decided to raise the issue again at the next staff meeting, in order to stimulate discussion with a view to effecting some change to more efficient and less disruptive school-wide message systems.

5.3 Teacher reflection

At the end of Cycle One we had arranged for Anne and Ruth to be released from their classroom teaching for a whole day, in order to take part in the off-site reflection day. The first half of the teacher reflection day was devoted to discussing the previously coded observation transcripts. We compared and cross checked my analyses with those of the teachers, and discussed the few discrepancies in coding that had occurred. When we were unable to reach a consensus, the coding assigned by the teacher was applied.

The second half of the reflection day was devoted to discussing the coded lesson transcripts in the light of the readings I had provided. Three weeks before I had given the teachers copies of two chapters from *The Guided Construction of Knowledge: Talk Amongst Teachers and Learners (*Mercer, 1995). Chapter Four, *The Learner's Angle*, provides an accessible, interesting, and sometimes amusing account of learning conversations, including analyses of observation transcripts. It provides a learner's point of view regarding the ambiguity of some teacher-student interactions, and highlights the pointless and tedious aspects of some learning conversations. I expected that reading

transcripts of other teachers' lessons would provide Anne and Ruth with points of comparison (positive and negative) with their own transcripts. Chapter Seven, *Teachers, Researchers, and the Construction of Knowledge*, discusses the roles of academic researchers and teachers in educational action research, emphasising partnerships, the sharing of expertise and experience, and reflection. I hoped that reading this would encourage the teachers to develop greater ownership of the research process and to take a more proactive role.

I asked the teachers to read each of the coded transcripts of their lessons in light of the readings, and to take note of any similarities to or differences between what they had read and their own learning conversations. I asked them to consider the kinds of questions they had asked, the explanations they had given, and the type of feedback they had provided to children. I suggested that they consider what learning was evident, and whether each lesson had achieved what they had intended.

At this stage the teachers did not appear to see any real connection between the readings that I had provided and the learning conversations in their transcripts. Both teachers were generally satisfied with the quality of the interactions in their transcripts, and their reflection on their practice was at a very superficial level. They seemed to see their teaching in a very general way. They offered very little critique of their own practice apart from their preoccupation with grammar. For example, they were both concerned that they spoke in incomplete sentences and used too much "slang."

> *Anne: I'm so embarrassed, I use so much slang, and I don't finish sentences. I hardly ever speak in proper sentences!* ***(Reflection Day: Cycle One)***

They were also unhappy with the length of many of their utterances, and their apparent domination of classroom talk.

> *Ruth: I can't believe how much I talk. Look at this! A whole page! … And another one. Those poor kids having to sit and listen!* ***(Reflection Day: Cycle One)***

Both Anne and Ruth noted how the transcripts provided evidence that some children dominated discussions, and although they showed some concern over the fact that some children did not feature at all, Anne justified this by suggesting that these children often were "taking it all in" and learning just as much as those who had a lot to say.

Both teachers focused mainly on quantitative information related to behaviour management issues and administrative interruptions. They were concerned about the number of interruptions to teaching and learning that had occurred, especially those that were created by the school administration and were therefore avoidable. Their resolution to present the research data and voice their concerns about this at a staff meeting (with a view to effecting some change), was in fact a pivotal moment in the research process, when they began to see the possibilities that the process provided to effect changes in their working environment.

Neither teacher registered concern at the relatively low percentage of interactions at Level Three in their transcripts. Both teachers were focusing on the effects of the actions of other people, including their students, on the type and quality of their classroom interactions, rather than on their own professional practice. At this stage of the research process the teachers were not reflecting on their practice deeply enough to examine or question the nature of their teacher talk, questioning, or feedback to students in the transcripts of their teaching. Their reflection-on-action at this point was at a technical level (van Manen, 1977). They both explained what they had learned about their practice in terms of external factors over which they had little control (Turner-Bisset, 2001). The teachers' preoccupation with external factors was consistent with claims (Elliott, 1991; Turner-Bisset, 2001) that teachers' vulnerability to criticism and fear of undermining their own professional status leads to a preference for collecting less personal quantitative data, because it helps them to objectify and distance themselves from their own practice.

5.4 Researcher reflection

At this stage of the study the teachers' level of reflection on their learning conversations was a matter of some concern. I had hoped that the information in the readings, along with the structure provided by the Hierarchy of Classroom Interactions, would enable Anne and Ruth to see their teaching in a different light, and to focus more closely on their interactions with students. Despite the fact that we had worked together on developing the Hierarchy of Classroom Interactions, they were still approaching the analysis of the transcripts of their teaching in a very superficial manner. They were focusing on surface features of dialogue, rather than on the substance of their teacher talk and the quality of their questioning and feedback. They did not appear to be particularly concerned about the relatively low proportion of their interactions with students that might lead to deep and meaningful learning.

My aim as the research facilitator had been to develop a community of practice in which the teachers would share control of the research. At the end of Cycle One we were some way off achieving this. It was also apparent that I would need to scaffold the teachers' towards more critical reflection on their classroom practice. In order to make the relationship between interactions at Level Three of the hierarchy and deep learning opportunities for students more explicit, I would need to provide them with more reading material about learning conversations and formative assessment, and to facilitate more in-depth discussion.

The teachers also needed to develop greater involvement in the research process. Their resolution to raise the issue of administrative interruptions at a staff meeting, with a view to effecting some change, was the first step in their journey towards this goal. It was in fact a small step towards their realisation that the research process might have an emancipatory role (Kemmis & McTaggart, 2000) as they undertook responsibility to change something in their working environment that hindered effective practice.

5.5 New questions

As a result of the discussions during the reflection day, the teachers had begun to develop a little more ownership of the research process. They developed the following questions that they wanted to investigate during the next research cycle:

- How often do messages and other administrative matters interrupt teaching?
- In what proportions do classroom interactions involve behaviour management concerns?
- Are there a disproportionate number of interactions with particular children?
- Which children are interacted with the most/least?

Although all of these questions are closed questions, quantitative in nature, and mostly concerned with the actions of people other than themselves, they were an encouraging first step in the teachers' move towards becoming independent researchers. These questions, along with the original or second order research questions that investigate the effects of professional development on teachers' thinking and practice, are addressed in Cycle Two.

CHAPTER SIX

CYCLE TWO: TERM FOUR 2003

When I look, and see all the talking I did! I thought it was bad last time. I tried to talk less, but I got worse. I think I was trying too hard some of the time. The trouble is I just go into autopilot a lot of the time when I'm teaching. (Ruth: Reflection Day, Cycle Two)

Cycle Two, which took place in Term Four, 2003, saw the beginning of a gradual shift from a second order to a first order action research inquiry. As a result of the personal analysis of the transcripts of their teaching at the end of Cycle One, and of the discussions during the reflection day, Anne and Ruth were beginning to develop some ownership of, and involvement in, the research process. Consequently they had developed a number of questions specifically related to their personal classroom practice. The questions the teachers wished to investigate in Cycle Two were:

- How often do messages and other administrative matters interrupt teaching?
- In what proportions do classroom interactions involve behaviour management concerns?
- Are there a disproportionate number of interactions with particular children?
- Which children are interacted with the most/least?

In Cycle Two I sought to answer the following four of the original, or second order research questions, related to the effects of the professional development aspect of the action research process on the teachers' thinking and practice:

- What factors influence the quality of learning conversations in classrooms?
- What changes occur in teachers' knowledge and thinking as a result of reflective professional development?
- What changes occur in teachers' practice as a result of reflective professional development?
- What changes occur in learning conversations as a result of reflective professional development?

To encourage the teachers to focus on the substantive aspects of their learning conversations, before the cycle commenced I provided them with copies of an excerpt from Chapter Eight of *Advanced Educational Psychology: For Educators, Researchers, and Policymakers* (Pressley & McCormick, 1995). The excerpt, headed "Instructional Conversations," discusses the distinction between conversations as they usually occur in classrooms, concerned mostly with managing the flow of the lesson, and true dialogue or natural conversations in which there are real attempts to inform and persuade in order to promote deep learning.

I had also provided the teachers with two readings on feedback; *Enriching Feedback in the Primary Classroom* (Clarke, 2003); and *Teacher Feedback to Students in Numeracy Lessons: Are Students Getting Good Value?* (Knight, 2003). Knight provides a useful summary of Tunstall and Gipps' (1996) formative assessment "feedback typology," which she uses to analyse the quality of feedback provided to students in the numeracy lessons of six New Zealand teachers. Knight found that of 349 examples of oral feedback to learners, none fitted the category "constructing the way forward" which equates to Level Three of our hierarchy. During the third week of the term, before the classroom observations commenced, we met after school to discuss the readings and their relationship to our research. In our discussion we focused on the nature of effective questioning and feedback, and compared Tunstall and Gipps (1996) feedback typology with the lesson transcripts in Cycle Five. This highlighted the predominance of low-level "evaluative feedback" that the teachers had provided.

6.1 Classroom observations

During Cycle Two, I observed and recorded five one-hour English lessons in each classroom. The purpose of the observations was to provide further information about factors that influence classroom conversations, to monitor changes in the teachers' classroom practice, and to provide information to answer the questions that had been generated by the teachers.

In Cycle Two, I asked the teachers to develop "learning outcomes" for each observed lesson, and to evaluate whether these had been achieved at the end of the lesson. Both teachers were accustomed to long-term planning (e.g., "units" of study over two or more weeks), and therefore did not specifically plan learning outcomes for every lesson that they taught. The purpose of requesting the development of learning outcomes was to assist the teachers to clarify their thinking about the learning (or lack of learning) that was occurring, by making it more explicit. I also asked the teachers to share the learning outcomes with their students, in view of research evidence that demonstrates the beneficial effects on learning of doing so (Assessment Reform Group, 2002; Clarke, 2003; Crooks, 1988; Sadler, 1989, 1998).

The observations followed the procedures developed during Cycle One (see Chapter 5, Section 5.2). The following section of this chapter provides information on the categorisation of teacher utterances according to the Hierarchy of Classroom Interactions, along with changes from Cycle One. In relation to the research questions that guided this cycle, information is provided regarding interruptions to learning conversations, interactions with individual children, and the teachers' use of pedagogical content knowledge.

6.1.1 Categorisation of teacher utterances

As in Cycle One, during the first half of the teacher reflection day we used the Hierarchy of Classroom Interactions to compare and cross check the previously coded observation transcripts. The overall percentages of teacher utterances in each category and each level of the Hierarchy Of Classroom Interactions in Cycle Two are summarised in Table 6.1 (p. 110).

Table 6.1: Categorisation of teacher utterances in Cycle Two*

LEVEL ONE: MANAGING THE CLASSROOM								
******	**A**	**R**		**A**	**R**		**A**	**R**
Administration	2.09	0.81	Managing			Personal /		
Routine	0.00	0.41	behaviour	10.48	4.07	Humorous	0.00	2.64
Sub-totals*	**2.09**	**1.22**		**10.48**	**4.07**		**0.00**	**2.64**
Total Level 1*	**Anne: 12.57**			**Ruth: 7.93**				
LEVEL TWO: MANAGING THE LESSON								
Imparting information			**Closed questions**			**Dead-end feedback**		
******	**A**	**R**		**A**	**R**		**A**	**R**
Framing	0.60	1.22	Cueing	13.77	5.69	Confirming	8.38	8.54
Linking	1.80	1.22	Establishing			Praising	5.69	5.28
Recapping	4.49	2.44	prior			Repeating	5.69	5.28
Motivating	0.00	3.05	knowledge	10.48	14.63	Negating	0.00	0.81
Directing	1.80	1.22						
Instructing	17.66	7.32						
Telling	6.88	20.12						
Sub-totals*	**33.23**	**36.59**		**24.25**	**20.32**		**19.76**	**19.91**
Total Level 2*	**Anne: 77.24**			**Ruth: 76.82**				
LEVEL THREE: MANAGING THE LEARNING								
Constructing understanding			**Open questions**			**Feedforward**		
******	**A**	**R**		**A**	**R**		**A**	**R**
Explaining	1.80	3.66	Inferential	3.59	2.23	Correcting	0.00	0.41
Connecting	0.60	1.63	Extending	0.00	0.41	Clarifying	1.80	3.66
Acknowledging	1.20	0.81	Challenging	0.00	1.22	Elaborating	1.20	0.41
			Metacognitive	0.00	0.81	Transferring	0.00	0.00
Sub-totals*	**3.60**	**6.10**		**3.59**	**4.67**		**3.00**	**4.48**
Total Level 3*	**Anne: 10.19**			**Ruth: 15.25**				
TOTAL*	**Anne: 100.00**			**Ruth: 100.00**				
Total number of utterances	**Anne: 334.00**			**Ruth: 492.00**				

*** Expressed as percentages of total utterances for each teacher**

**** A = Anne : R = Ruth**

6.1.2 Changes in pedagogy

During Cycle Two the percentage of utterances at Level One was very similar to those in Cycle One for both teachers. For both teachers the percentage of utterances at Level Two increased, while the percentage of utterances at Level Three decreased. The percentages of teacher utterances at each level of the hierarchy in Cycles One and Two are summarised in Table 6.2.

Table 6.2: Teacher utterances at each level of the hierarchy in Cycles One and Two*

	Anne			Ruth		
	Level One	**Level Two**	**Level Three**	**Level One**	**Level Two**	**Level Three**
Cycle One	13.37	67.09	19.54	7.77	72.14	20.09
Total number of utterances	389			528		
Cycle Two	12.57	77.24	10.19	7.93	76.82	15.25
Total number of utterances	334			492		

- **Expressed as percentages of total utterances per cycle for each teacher**

Anne and Ruth were both gratified to learn that the overall percentage of utterances at Level One had not increased from Cycle One (see Table 6.2). However, the majority of utterances for both teachers were again at Level Two of the hierarchy, despite their intentions, and their concentrated effort to "reach Level Three more often." The percentage of Anne's utterances at Level Two had increased from 67.09% to 77.24%, and Ruth's had increased from 72.14% to 76.82% (see Table 6.2).

In Cycle Two there was a lower proportion of teacher utterances at Level Three in both classrooms (see Table 6.2). As both teachers acknowledged, the decrease in the percentage of Level Three utterances was almost completely attributable to the increase in the percentage of Level Two utterances.

Anne: I seemed to get stuck in Level Two most of the time. Mostly instructing with the class, the poor listening skills, it's really hard to get to any kind of deep thinking. ***(Reflection Day: Cycle Two)***

Anne talked about the "extension" that occurred in Level Three in relation to the students' content knowledge.

Anne: There was extension when we did get to Level Three, with inferential questions. The level of questioning rose as the lesson progressed. It was interesting that where the ***children*** *had more content knowledge the level of questioning went up more quickly, and then, once tasks were set, I came right back to Level Two, to instruction more.* ***(Reflection Day: Cycle Two)***

Both Anne and Ruth realised that at Level Three the lesson is much less under the teacher's control.

Ruth: This is the part of the lesson that doesn't always go the way that you think it might, because you don't know how far the kids are going to take it anyway. ***(Reflection Day: Cycle Two)***

Anne: Yes, this is where you have to be much more open-minded, and if you're doing "whole class," this where the gap is much wider, between the top and the bottom. ***(Reflection Day: Cycle Two)***

Pressley and McCormick (1995) believe that the difficulty that many teachers have with giving up control of their lessons is the reason that what they call "true dialogue" is comparatively rare. The unprompted recognition of the issue of control, by both teachers, is an indication of some development in their reflective skills.

6.1.3 Increase in specific Level Two utterances

During Cycle Two both teachers had put more conscious effort into their teaching in order to achieve their goal of accomplishing more interactions at the third level of the hierarchy. However, rather than achieving an improvement in their learning conversations, the opposite had occurred. Instead of interacting more at Level Three, both teachers were actually doing proportionately *more* of what they had been doing previously at the second level of the hierarchy, and a great deal of this was unproductive

and sometimes tedious. A summary of specific utterances at Level Two in Cycles One and Two is provided in Table 6.3.

Table 6.3: Specific Level Two teacher utterances in Cycles One and Two*

		Anne		Ruth	
		Cycle One	**Cycle Two**	**Cycle One**	**Cycle Two**
Imparting Information	**Framing**	1.28	0.60	2.84	1.22
	Linking	0.51	1.80	0.95	1.22
	Recapping	1.54	4.49	0.38	2.44
	Motivating	0.00	0.00	1.70	3.05
	Directing	2.83	1.80	0.76	1.22
	Instructing	8.23	**17.66**	5.30	7.32
	Telling	5.91	6.88	8.23	**20.12**
Sub-total*		**20.30**	**33.23**	**20.26**	**36.59**
Closed questions	**Cueing**	13.11	13.77	3.79	5.69
	Establishing knowledge	5.14	10.48	10.98	14.63
Sub-total*		**18.25**	**24.25**	**14.77**	**20.32**
Dead-end feedback	**Confirming**	9.77	8.38	9.47	8.54
	Praising	6.94	5.69	13.07	5.28
	Repeating	11.83	5.69	12.87	5.28
	Negating	0.00	0.00	1.70	0.81
Sub-total*		**28.54**	**19.76**	**37.11**	**19.91**

*** Expressed as percentages of total utterances per cycle for each teacher**

In Cycle Two the percentage of Level Two dead-end feedback given by both teachers had decreased. Ruth was particularly pleased with the decrease in the proportion of her Level Two feedback. However, there were much higher percentages of teacher talk involving

imparting information in this cycle. Ruth did proportionately more telling than in Cycle One (see Table 6.3, p. 113).

> ***30.10.03 (Cycle Two/Observation Transcript/R/2)***
> *Ruth: We would actually need to put more branches on the tree.* [A family tree] *This tree has been pruned. Um… so … we would need an extra circle. We'd only need one extra circle because* ***you*** *are mentioned* ***there****. So* ***if*** *this was about C, it would have M, L, R, R, K, and G* [names of C's siblings], *… and then your mum and dad's names, there, …and then their mums' and dads' names, and you can actually go from there, with their mums' and dads' names, and your mum's sisters would come all the way along here, brothers and sisters, and then the tree would carry on, and be a really huge tree.*

Ruth accurately pointed out that telling was often an expedient way of imparting required information. She did express concern about the proportion of teacher talk in her transcripts, although at this point she was not distinguishing between the different levels.

Anne had spent proportionately more of her teaching time instructing than in Cycle One (see Table 6.3, p. 113). Anne was concerned at the increase in the proportion of instructing in her transcripts. However she explained this increase in terms of the poor behaviour and listening skills of her students, and had not really appreciated the degree to which she had repeated herself over and over in her lessons, in places to little effect, as illustrated in the following excerpt.

> ***18/11/03 (Cycle Two/Observation Transcript/A/4)***
> *Anne: Read each chunk twice. … Repeat each chunk twice. Now when you're dictating you need to dictate in chunks that make sense. You can't separate busy from traffic. Busy is describing the traffic. Now, the busy Auckland traffic would be one chunk. So it's got to make sense for the listener, otherwise they can't connect the ideas in time to write it down. So the busy Auckland traffic, … is one chunk, … is driving down Queen Street. You might separate "is driving down" because we're thinking, "Ooh I wonder where it's going?" But then you get Queen Street … and you can hold that in your head long enough to connect the two together. So it's got to make sense to the listener and the writer. … Right, W, can you follow with your statement, which is about the traffic as well. Short*

one … pencils down. … Find where this is happening, and ready to listen. Are you ready to listen to W? … We'll have the whole sentence and then dictate in chunks.

W: *What I see in the picture is people going to work, and buildings.*

Anne: *Yes. That's fine. So, actually we can have the whole sentence. Right? Dictating the first chunk. … Right, with picture number two, you're going to go with a buddy now and you're going to dictate to each other, statements about, different statements about, picture number two, which is the olden days' house from up North … on a new page. … Go with a buddy, and … you work out a statement about the picture and you dictate it to your buddy. So one will be dictating, one will be writing, and then you'll swap over. Just like we're doing, just like spelling testing. OK? Going with a buddy. You've got until twenty-five past. Do two statements each. Each person, A, writes two sentences about the picture, and dictates them to their buddy.*

This kind of repetitive discourse may have been partly due to the unruly nature of Anne's class, and to their poor listening skills, but it often became laborious and confusing. As a consequence many more of the children began to "switch off," resulting in a recursive cycle of poor listening and repeated instructions.

Both teachers asked a much higher percentage of closed questions in Cycle Two than in Cycle One. These questions mainly involved cueing and establishing what the students already knew in order to maintain the flow of the lessons. Because at this point in the study Anne was not distinguishing between the open and closed questions in her transcripts she saw this as a positive factor.

Anne: *What pleased me was the amount of questioning. I think it's just guided learning. Asking the* ***children*** *about things, rather than* ***telling*** *them. There's very little telling, so it's quite heartening to see.* ***(Reflection Day: Cycle Two)***

She explained her questioning as "guided learning," which she considered to be preferable to "telling." Anne's belief was consistent with claims in the relevant literature (e.g., Bransford, Brown & Cocking, 1999; Bransford, Derry, Berliner, & Hammerness,

2005; Bullough, 2001; Hammerness, Darling-Hammond, & Bransford, 2005; Mercer, 1995; Sfard, 1998; Young, 1992) that many teachers have an aversion to the direct transmission of content.

Ruth was able to clearly articulate the way in which teachers use closed questions and teacher talk to direct the flow of their lessons.

> *Ruth: Sometimes you don't pick up on what children say, and you just steer the lesson where you want it to go. Asking questions and telling them what they need to know to get them where you want them to be more quickly.* ***(Reflection Day: Cycle Two)***

Ruth's comment is consistent with the literature in which it is claimed that teachers deliberately use discourse to manage their lessons, often at the expense of real teaching and learning (e.g., Mercer, 1995; Pressley & McCormick, 1995; Young, 1992).

6.1.4 Interruptions

Administration and messages

At the end of Cycle One, Anne and Ruth had taken evidence from our analysis of the observations and field-notes to a school-wide staff meeting to argue for changes to the administration message system. In addition, they brought to the attention of other staff members the number of unnecessary interruptions to teaching and learning caused by teachers and child messengers moving between classrooms during teaching time. Many of the other teachers were supportive, as they were also tired of interruptions to their teaching time. As a result an agreement was reached among the staff to streamline the school's message systems.

A simple change to the administration message system made a notable difference. Instead of the notices being delivered on a clipboard by a messenger who waited for the teacher to read them to the class, it was decided that the messenger would in future deliver a photocopy of the messages to each teacher to be read to their class at a suitable break in teaching time. It was also agreed that only very urgent messages would be

delivered over the school intercom. In addition the staff agreed to ban all but urgent movement and messages between their classrooms during teaching time. As a result, during Cycle Two there was a lower proportion of recorded administrative interruptions in both classes during teaching and learning time. The changes from Cycle One to Cycle Two in the percentages of teacher utterances related to administration and messages are summarised in Table 6.4.

Table 6.4: Teacher utterances related to administration in Cycles One and Two*

	Anne	Ruth
Cycle One	4.63	3.22
Cycle Two	2.09	0.81

*** Expressed as percentages of total utterances per cycle for each teacher**

The evidence that the small modifications that the teachers had initiated in the school's message systems had resulted in a small reduction in interruptions gave both Anne and Ruth a sense of empowerment. Ironically however, the decrease in the proportion of administrative interruptions did not see a corresponding decrease in the proportion of interruptions due to behaviour management, in fact the reverse was the case.

Behaviour management

Teacher utterances related to behaviour management in Cycles One and Two are recorded in Table 6.5.

Table 6.5: Teacher utterances related to behaviour management in Cycles One and Two*

	Anne	Ruth
Cycle One	6.94	0.76
Cycle Two	10.48	4.07

*** Expressed as percentages of total utterances per cycle for each teacher**

Some of the Year 6 boys in both classes had become extremely self-important as they neared the end of their time at primary school. In Ruth's class the proportion of behaviour related interruptions increased markedly. Ruth was unhappy about this.

> *Ruth: Most of my time in Level One was spent on behaviour management, much more than last time.* ***(Reflection Day: Cycle Two)***

As the school year progressed Anne's class had become progressively more unruly. In Cycle Two, behaviour management issues had increased to the point where they were taking up more than ten per cent of her total interactions with students. B, in particular, was becoming increasingly difficult to manage. The following excerpt from the fieldnotes is an example of B's disruptive influence.

> ***18/11/03 (Cycle 2/Fieldnotes 5)***
> *8.55. Bell rings. Anne is settling a major, physical, dispute between B and L. Other children* ***slowly*** *settle on mat.*
> *9.00. B and L finally seated. Anne calls the roll - class sing morning song.*
> *9.10. Just about to commence lesson, interrupted by messenger.*
> *9.15. Class just settled again, when another "flare-up" occurs between B and L. … B verbally abusive and shouting.*
> *9.20. Lesson finally begins. B is fiddling, and doesn't have the equipment he needs.*
> *9.30. B is wandering around, disturbing other students, making inane remarks. Class is generally unsettled.*
> *9.50. B is still refusing to sit down and do his work. By now many other children are also off-task.*

Interestingly, Anne seemed to be pleased to learn that behaviour management was not more prominent, given the nature of her class.

> *Anne: Still too much on Level One, with organisation and behaviour management mainly … but less than I thought with the class the way it is.* ***(Reflection Day: Cycle Two)***

6.1.5 Interactions with individual students

In Cycle One, analysis of the observation transcripts had revealed that some students participated in the lessons much more than others. We had discovered that there were some students in both classes with whom the teachers had not interacted at all. Both teachers were very concerned about this. As a result, two of their questions to be investigated in Cycle Two concerned the number of interactions with individual children. A summary of the number of teacher interactions with individual students in Cycle Two is recorded in Table 6.6.

Table 6.6: Teacher interactions with individual students in Cycle Two

	Anne	Ruth
Total number of students	34	33
Total number of interactions	334	492
Average number of interactions per student	9.82	14.91
Individual students with most interactions	W 28 J 28	C 73 H 56
Number of students with no interactions	5	9

The average number of interactions per student across all five teaching sessions was low (Anne, 9.82; Ruth, 14.91). There were several students with whom the teachers had not interacted at all during the five sessions (Anne, 5 students; Ruth, 9 students). Anne attempted to justify this by saying that the students, who were generally quiet and undemanding, would be listening and "taking it all in." However, there was no evidence that this was the case.

Surprisingly, the students with behavioural problems were not those who received the most attention. Both teachers had two students with whom they interacted a great deal more than with the rest of their class. Anne tended to focus attention on W and J, who were both involved in 28 out of 334 interactions. Ruth focused a great deal of her attention on C, who was involved in 73 interactions, and H, who was involved in 56

interactions, out of 492 interactions in total. The interactions with these students were mostly related to the closed questions that the teachers were using to direct the flow of their lessons. Both teachers realised that they had been relying on these students to transmit information, and Ruth in particular was shocked at the disproportionate amount of attention that they received.

6.1.6 Use of pedagogical content knowledge

Effective use of pedagogical content knowledge

Effective teachers use their pedagogical content knowledge to make subject matter comprehensible to learners by presenting ideas in the form of analogies, illustrations, examples, and demonstrations (Darling-Hammond, 1998, 2000a, 2000b). Both of the teachers frequently used their pedagogical content knowledge to represent content in forms that were meaningful and accessible to their students. Anne often used real life examples of students in her class (or people known to them) in order to explain or clarify ideas.

> ***28.10.03 (Cycle Two/Observation Transcript/A/1)***
>
> *Anne: What do you think would have happened to Soryan*? [Young woman in Vietnamese refugee camp]
>
> *W: She might have suffered and died?*
>
> *J: She could have gone to another refugee camp?*
>
> *Anne: They **could** have done. S and F? … You stayed at the refugee camp in Mangere didn't you? How long were you there for when you first came to New Zealand?*
>
> *S: Six weeks.*
>
> *Anne: For six weeks only. Did you both come at the same time? … You did. … Would you be happy if the children worked out some questions that they could ask you about where you came from and the place, your country, and why you came, and what it was like on your journey, and in the refugee camp?*

Ruth tended to use more abstract metaphors and analogies to help her students to understand complex ideas.

> ***26.11.03 (Cycle Two/Observation Transcript/R/4)***

Ruth: *When you write, you need to have a look at what it is you're writing, and that sentence, … Is it complete? … Does it make sense? … Because a sentence is really the tiniest story in the world. It's one* ***mini story****. We keep adding to it with other sentences to make a more interesting story, but it's a mini story. It has to make sense on it's* ***own****. "Today I went to the park." That's a story. That is a complete sentence, and it's a complete mini story.*

Problems resulting from gaps in teachers' subject content knowledge

Analysis of teaching across a number of subject areas has revealed that a lack of subject content knowledge can affect teachers' ability to present accurate information in coherent ways (e.g., Gregg, 2001; Sanders & Morris, 2000; Soares & Prestage, 2000; Torrance & Pryor, 1998). There were a number of occasions during Cycle Two when gaps in the teachers' content knowledge resulted in lessons moving off in time-consuming tangents. When the teacher lacks sufficient content knowledge to answer students' questions, or to follow up on gaps in their understanding, the result is often the creation of greater confusion for the students. The following example from one of Ruth's lessons (about genealogy) provides an illustration of this.

30.10.03 (Cycle Two/Observation Transcript/R/2)

Ruth: *What is a surname?*
C: *It's a family name. It's already there.*
Ruth: *Yes, you're absolutely right C. You've inherited it. Your dad kind of gave it to you. Does anyone know the origin of this word, where does it come from?*
K: *Like if you're a boy, you're sir?*
Ruth: *Possibly. So … Surname. It could be because you're male. Maybe it's another spelling of that? … The word sir S I R. What does it stand for?*
J: *Maybe it's the surname because you get the name of the man?*
Ruth: *Yes, you might be right. I have no idea. No I don't! … So, where do we go to find that out?*
J: *A dictionary!*

[There is a delay while J and L look up "surname" in their dictionaries.]

Ruth: *The meaning of a surname … what does your dictionary say?*
J: *The name held by all members of a family.*

Ruth: The name held by all members of a family. No it doesn't give any origins there. Sometimes at the beginning of a dictionary it has little things in brackets Lt for Latin, or Fr for French. See if it's got an origin there? What were you looking up L? Having trouble? Did your dictionary come up with anything?

L: It just says surname, name, noun.

Ruth: It doesn't say anything about origins. OK. So it's not giving us much information. We need to look at ***my*** *dictionary.*

Unfortunately when Ruth used her Concise Oxford Dictionary to attempt to clarify matters, she did not have the content knowledge required to know that the answer lay in the prefix "sur," and she went no further than to look up the word "surname." As a result the question was left unanswered. Although it is unrealistic to expect teachers to "know all the answers," this was an example of a gap in content knowledge leading to a fruitless and time-consuming deviation from a planned lesson, which Ruth herself acknowledged after the lesson.

29/10/03(Cycle 2/Fieldnotes 2)
After the lesson Ruth says that she feels it has been a disaster - that the lesson was "all over the place." She remarks on the dangers of asking the children about the origins of a word when she did not know the answer herself.

6.2 Teacher reflection

At the end of Cycle Two, I organised for the teachers to be released from their classrooms again for another off-site reflection day. The first half of the day was again devoted to discussing the previously coded observation transcripts, and comparison and cross checking of our analyses.

Before the reflection day I asked the teachers to look back over the readings I had given them at the beginning of the cycle (Knight, 2003; Pressley & McCormick, 1995). In addition Ruth had found a New Zealand Listener article, *Done Too Much, Much Too Young* (Welch, 2003), which discusses the crowded school curriculum and questions

whether depth of learning has been sacrificed for broad but shallow teaching. The fact that Ruth provided this article on her own initiative attests to her increasing reflection and involvement in the research process. Discussion in the light of the readings covered the following range of topics; interruptions, learning outcomes, formative assessment, content knowledge, and professional development

6.2.1 Interruptions

Not surprisingly, the first topic to be raised by the teachers at the reflection day was the reduction in interruptions to teaching time as a result of the agreements reached at the staff meeting. Both teachers were astounded at the differences the small changes to the message system had made.

> *Anne: First of all I was absolutely amazed at how the interruptions weren't as many and I wanted to know, did you cut out any of the interruptions?* ***(Reflection Day: Cycle Two)***

The realisation that they may have been instrumental in effecting this change had given both Anne and Ruth real feelings of empowerment, and as a result they were beginning to develop a greater sense of ownership of the research process as a whole.

> *Ruth: I'm amazed that a simple thing like that, showing some stuff at a staff meeting, could make such a difference. It's amazing what being armed with facts and figures can do!* ***(Reflection Day: Cycle Two)***

In addition, examining the effect of interruptions on their teaching had served to stimulate the teachers' thinking about the depth and quality of the learning interactions in their lessons.

> *Ruth: It would be really interesting if you could have a lesson, that was totally interruption free, to see how far you could get.* ***(Reflection Day: Cycle Two)***

6.2.2 Learning outcomes

Both teachers had interesting comments to make regarding my request for specific learning outcomes for each lesson. They discussed the loose structure of their lessons and the incidental nature of much of the teaching and learning that had occured.

> *Ruth: Something that interested me, it was really funny, when you asked me about what I wanted to achieve, what I wanted the kids to learn, the* ***learning outcomes****, because I never usually really think about that! Often when you do lessons they never get finished, or you change the track and you carry on, or the kids change the track and send you in another direction. I'd start off with an idea, but I never really knew how it was going to end.* ***(Reflection Day: Cycle Two)***

> *Anne: Mmmm. And you do it all the time. Because sometimes you start off doing something, and you end up doing something totally different, because the needs present differently, from what you thought. So you end up doing it a different way.* ***(Reflection Day: Cycle Two)***

> *Ruth: The lesson ends when you arrive at this place that you haven't predetermined. I think, when something's been achieved, "Oh, that must be it!" Often as you're going along, something pops into your head. This happens to me quite often, I don't know whether that's a "me" thing or whether it happens to everybody. Where you think, "Ooh, that would be a good thing to talk about." So you take them to there, and then you come back. There are side issues all the time.* ***(Reflection Day: Cycle Two)***

Anne and Ruth both discussed the fact that they tended to conceptualise individual lessons in terms of the activities that they have planned, rather than in terms of learning. Their comments are consistent with the findings of Alexandersson (1994). Although student teachers are often required to formulate specific learning outcomes for single lessons, experienced classroom teachers in New Zealand are more often accustomed to planning units of work for which they formulate comparatively broad and general learning outcomes to be developed over a period of days or even weeks. This would appear to account for the loose structure of the teachers' individual lessons, and the emphasis on activities rather than outcomes.

6.2.3 Formative assessment

The discussion about learning outcomes and the structure of their individual lessons led the teachers into a discussion about formative assessment. Anne picked up on Ruth's comment about side issues and linked this to the way in which she adapted her teaching to cater for students' learning needs.

> *Anne: They're* [side issues discussed by Ruth] *indicated by the kid's needs. They show you what their needs are, and they show you what prior knowledge they've got on whatever you're discussing. The gaps soon become evident, so you think, "Oh, I'll explain it this way instead." Because that will address that need, that's obvious.* ***(Reflection Day: Cycle Two)***

At this point in the discussion Ruth pointed out that we were actually talking about formative assessment. Anne then discussed how comments made by the students gave her insight into the depth of their thinking.

> *Anne: Some of the kids got into some pretty heavy thinking, about the little refugee girl, and what went on in her life, and why her life was what it was like. One thing that interested me was B's comments,* [that Soryan "wanted to be heard" and that the refugees "hearts were filled with loneliness"] *and I remember thinking at the time "Yeah, that's some pretty deep thinking!" I just connected it to the next question, but it told me something about B* [who exhibits behavioural difficulties] *that I hadn't realised, that he was really thinking quite deeply.* ***(Reflection Day: Cycle Two)***

In this case Anne had not acted on the information that she had received about B's thinking immediately, and it had not altered the substance of the lesson, but she had reflected on it later.

6.2.4 Content knowledge

When asked how they thought the depth of their content knowledge influenced the quality of their interactions Anne acknowledged the importance of being aware of "the

bigger picture" in terms of maintaining the direction of the lesson. She also alluded to the co-construction of understanding, or "learning together."

> *Anne: Greatly. In the one where we looked at … a picture of old Auckland, … I can see from what I've said there that sometimes I'm not sure either, so we're learning together. Whereas with the Social Studies one, I had done that unit before, so I knew where I was going, even if the kids were going to lead me somewhere else, I had a bigger picture* [of the overall aims of the Social Studies unit]*, and content knowledge, and I'd done the research on the state of Saigon at the time, so I was better versed than I was in that one there.* ***(Reflection Day: Cycle Two)***

Anne also stated her belief that the likelihood of reaching Level Three in her interactions with students was as much a function of the students' prior content knowledge as her own.

> *Anne: Here* [indicates transcript] *where the kids had better content knowledge, Level Three was more extensive, than the one where I was introducing something, a different level of thinking actually.* ***(Reflection Day: Cycle Two)***

Ruth discussed the lesson in which she had got tangled up in the fruitless discussion of the origin of the word surname.

> *Ruth: In this lesson, this bit about the surname, that's a great example of what not to do. Look in the dictionary and don't find the answer! I don't know who was more confused, me or the kids. There'll always be something like that, that can come up, and you don't know. Still, it's not the end of the world. You can't have all the answers when you have to teach everything.* ***(Reflection Day: Cycle Two)***

Although Ruth acknowledged the problem created by the gap in her content knowledge, she subsequently justified her lack of this specific knowledge in terms of the impossibility of having "all the answers." Given that New Zealand primary teachers are expected to teach across the whole range of curriculum subjects there is some justification for her argument, which is supported by Welch (2003), who claims that as

the school curriculum continues to expand, depth of learning is being sacrificed for broad but shallow teaching.

6.2.5 Professional development

To be effective, professional development should be located in the teachers' real world and relevant to their everyday concerns (Willis, 2000). Mitchell and Cubey (2003) emphasise the importance of the role of professional development advisers and researchers in establishing goals, observing teachers and providing feedback, scaffolding reflection, and offering theoretical and pedagogical knowledge along with information about alternate practice. Clear evidence has been provided that quality professional development happens on site in schools, with teachers receiving ongoing support and encouragement from colleagues.

As part of the general discussion, Anne made the following comment in relation to the contribution of the research process to her professional development.

> *Anne; It's terribly interesting, and I think it's really good to do this, because I think this is what we should do daily, weekly anyway. It made me really look at my teaching. There's all these things to improve on.* ***(Reflection Day: Cycle Two)***

Both teachers considered the analysis of their transcripts to be affirming.

> *Anne: It's quite heartening to see, the pattern that follows in each of the transcripts. And you're doing these things without even thinking about it! It's amazing how much learning went on, when you know what the class is like. I'm amazed at how far we get. I'm really pleased. It's like a form of self-appraisal. It's also affirmation.* ***(Reflection Day: Cycle Two)***

> *Ruth: It's made me realise that I'm actually teaching them something!* ***(Reflection Day: Cycle Two)***

These comments indicate that Anne and Ruth were still, for the most part, not able to critique their own practice objectively. They were still looking at the overall picture and

focusing on what they saw as positive aspects of their teaching, rather than critiquing specific teaching and learning interactions.

However, Anne's reference to "doing these things without even thinking about it," and the following comment by Ruth, are both an indication of some level of recognition of unreflective practice.

> *Ruth: When I look, and see all the talking I did! I thought it was bad last time. I **tried** to talk less, but I got **worse**. I think I was trying too hard some of the time. The trouble is I just go into autopilot a lot of the time when I'm teaching.* ***(Reflection Day: Cycle Two)***

Here Ruth is acknowledging her lack of ability to reflect-in-action, which she refers to as "autopilot." Ironically her recognition of this is an indication of an increase in her ability to reflect-*on*-action.

During the reflection day Ruth commented on the isolation of classroom teaching, and expressed interest in finding out more about "what other teachers do." She asked whether each teacher might be able to read and comment on the other's lesson transcripts in the next cycle. Anne readily agreed with the suggestion, which we incorporated into our planning for Cycle Three. Both Anne and Ruth were very positive about the nature of the professional development that they were receiving as part of the action research process, including the analysis of their own lesson transcripts, the opportunities to discuss and reflect on their teaching, and the readings provided. Both felt that the process was constructive, meaningful, and helpful.

6.3 Researcher reflection

At the end of Cycle Two, I had serious concerns about what had been achieved so far. The teachers were beginning to look at the teaching and learning that was occurring in their transcripts, but they were still not making direct links between their own practice

and what was in the readings. They had demonstrated some insight into the dynamics of their teaching, in particular their recognition of the ways in which they exercised deliberate control over the development of their lessons. However, they had not yet reached the stage where they were able to critique their practice independently. Although the teachers were beginning to develop the ability to reflect on their practice after it had occurred they did not appear to be engaging in reflection during their teaching at all. In Cycle Two, increased effort had actually resulted in an increase in what they what they been doing at Level Two rather than a change in the nature of their interactions. This was confirmation that the teachers to some degree lacked consciousness of their teaching as it progressed.

According to Schon (1983), in true inquiry the practitioner reflects both while engaged in an action, and subsequently on the action itself. While the teachers were beginning to engage in what Schon referred to as reflection-on-action they did not appear at this stage to be engaging in what Schon termed reflection-in-action. This is consistent with the literature on reflection-in-action (Loughran, 1996; McNamara, 1990; Turner-Bisset, 2001) which highlights the difficulties teachers face when attempting to reflect on their practice while engaged in the multiple and complex demands of classroom teaching. In accordance with claims made by McNamara (1990) it was apparent that Anne and Ruth were going to need explicit guidance to assist them to reflect during the interactive phase of teaching. However their independent acknowledgement of “doing things without thinking about them” (Anne), and engaging in “autopilot” (Ruth), were an indication of some level of recognition of the problem.

At the end of Cycle Two, Anne and Ruth were both more involved in the research process than they had been at the end of Cycle One. They had developed a sense of empowerment as a result of the changes to the message system. They were now much less self-conscious about their teaching, to the point where, in the next cycle, each was now prepared to undergo the scrutiny of the other in the analysis of their lesson transcripts. In addition, rather than focusing on interruptions and outside influences, the teachers were now beginning to focus on the effects of their own behaviour on the quality

of their learning conversations. Both Anne and Ruth expressed the objective of lowering their proportion of Level Two utterances and increasing the proportion of their Level Three utterances in the next cycle. Anne was keen to see a lower proportion of instructing, and Ruth a lower proportion of talking and telling. If they were to achieve their objectives, both teachers would need more professional development and scaffolding, firstly in reflection-in action, and secondly in classroom discourse and learning conversations. Further reading and more in-depth discussion in this area would add to their understanding of ways in which to promote deep learning, and would make the purposes of the different types of Level Three interactions more explicit.

With this in mind I provided them with two readings, to be read during the summer holiday break, and to be discussed at the beginning of the school year. The first was a summary of Bloom's *Taxonomy of Educational Objectives* (Bloom, 1956). McGee (2001) argues that if teachers were to develop their questioning to cover the whole range of categories of thought in Bloom's (1956) Taxonomy (recall, comprehension, application, analysis, synthesis, evaluation) they would be more effective in developing students' thinking. While both teachers were vaguely familiar with Bloom's Taxonomy, neither had considered its relationship to classroom questioning and feedback. The second reading was a section on effective questioning from *Working Inside the Black Box: Assessment for Learning in the Classroom* (Black, Harrison, Lee, Marshall, & Wiliam, 2002) which makes explicit the link between higher-order, open-ended questions, and the development of students' understanding.

Because the next Cycle of action research would be undertaken in a new school year, with new classes comprising different students, it would be necessary to obtain informed consent again from the parents and children in each class. This would be likely to result in a delayed start to the observation phase of the cycle. In addition the change in the makeup of each teacher's class would mean that changes in a number of factors, including classroom dynamics and student behaviour, would be inevitable.

6.4 New questions

Both Anne and Ruth were keen to see whether their own behaviour would change or remain relatively constant with a different group of children. Anne had been particularly concerned with the extent to which her interactions in Cycle Two involved behaviour management. She was anxious to see whether there would be any reduction in this with a different class. Both teachers were keen to monitor their interactions with individual students with a different class, in order to see whether they were continuing to allow some children to dominate their attention at the expense of others.

As a result of the reflection and discussion during the reflection day the teachers developed the following questions that they wished to investigate in the next research cycle:

- Can we increase the proportion of interactions at Level Three?
- Is there a difference in the proportion of behaviour management related interactions with a different class?
- Are there a still a disproportionate number of interactions with particular children with a different class?

CHAPTER SEVEN

CYCLE THREE: TERM TWO 2004

> ***It's made me connect to the learning outcomes more consciously during the lessons and refer children to reasons for doing what they're doing. It's made me really think about what I want them to learn, instead of what we're going to be doing. (Anne: Reflection Day, Cycle Three)***

Cycle Three was undertaken in a new school year. With two new classes comprising different students, it was necessary to repeat the process of gaining informed consent from the students, parents, and caregivers. Although the Information Sheets and Consent Forms were sent out in the second week of Term One, they were not all returned until the sixth week. Because it was then too late to complete the five weeks of observation and the reflection process before the end of the term, there was a delayed start to Cycle Three, which did not commence until Term Two, 2004.

In Cycle Three the gradual shift from a second order enquiry to a first order enquiry continued. Anne and Ruth were developing more self-confidence both as teachers and as researchers, and their initial self-consciousness had all but disappeared. They had reached the point where in this cycle, at Ruth's suggestion, they were comfortable with the idea of reading and commenting on each other's lesson transcripts. In addition, Anne suggested keeping individual reflective journals to be filled in after each observed lesson and at regular intervals throughout the cycle. Both teachers believed that this would assist them with keeping track of critical incidents, and with developing their depth of reflection. The journals were also referred to retrospectively during the reflection day at the end of the cycle.

In order to make the purposes of the different types of Level Three interactions more explicit, during Term One, before Cycle Three commenced, I facilitated two discussion sessions based on the readings I had provided for the teachers at the end of the previous cycle. In the first session we discussed the summary of Bloom's Taxonomy (Bloom, 1956), and the ways in which it related to questions at Levels

Two and Three of the hierarchy. Although both teachers had prior knowledge of Bloom's Taxonomy, neither had ever consciously applied it to their classroom questioning. In the second session, we discussed the section on effective questioning from *Working Inside the Black Box: Assessment for Learning in the Classroom* (Black, Harrison, Lee, Marshall, & Wiliam, 2002). This makes explicit the link between higher-order, open-ended questions, and the development of students' understanding. The authors also discuss the importance of allowing for "wait time," to give students time to think before answering questions, and to encourage wider participation in whole-class discussions. In this session we also reviewed the article on teacher feedback to students (Knight, 2003) that the teachers had been given in Cycle Two.

The outcome of the reading and discussion was that both Anne and Ruth expressed a desire to monitor and develop their use of questioning and feedback to students during Cycle Three. This indicated that there had been a real breakthrough in their thinking about their pedagogy, particularly in relation to the links between effective questioning and feedback and deep learning. As a result of the reflection and discussion at the end of Cycle Two the teachers had developed the following questions:

- Is it possible to increase the proportion of interactions at Level Three?
- Is there a difference in the proportion of behaviour management related interactions with a different class?
- Are there a still a disproportionate number of interactions with particular children with a different class?

Following the reading and discussion before the Cycle Three observations commenced, the teachers developed three additional questions that they wished to investigate:

- What percentages of our interactions involve instructing, telling, and explaining
- What types of questions do we ask students?
- What types of feedback do we give students?

In Cycle Three, I continued to seek information in relation to the following four of the original, or second order research questions, related to the effects of the professional

development aspect of the action research process on the teachers' thinking and practice:

- What factors influence the quality of learning conversations in classrooms? What changes occur in teachers' knowledge and thinking as a result of reflective professional development?
- What changes occur in teachers' practice as a result of reflective professional development?
- What changes occur in learning conversations as a result of reflective professional development?

7.1 Classroom observations

During Cycle Three, I observed and recorded five one-hour sessions in each classroom. As in previous cycles, the purpose of the observations was to provide additional information about the factors that influence classroom conversations, to monitor changes in the teachers' classroom practice, and to answer the teachers' personal questions. The observations followed the procedures developed in previous cycles (see Chapter 5, Section 5.2). The following section of this chapter provides information on the categorisation of teacher utterances according to the Hierarchy of Classroom Interactions, along with changes from Cycles One and Two. In relation to the research questions that guided this cycle, information is provided regarding the proportion of behaviour management related interactions, interactions with particular children, and interactions involving instructing, telling, explaining, questioning, and feedback.

7.1.1 Categorisation of teacher utterances

As in the previous two cycles, during the first half of the teacher reflection day we used the Hierarchy of Classroom Interactions to compare and cross check the previously coded observation transcripts. The overall percentages of teacher utterances in each category and each level of the Hierarchy of Classroom Interactions in Cycle Three are summarised in Table 7.1 (p. 136).

Table 7.1: Categorisation of teacher utterances in Cycle Three*

LEVEL ONE: MANAGING THE CLASSROOM								
******	**A**	**R**		**A**	**R**		**A**	**R**
Administration	3.80	2.19	Managing			Personal/		
Routine	1.09	1.02	behaviour	4.62	2.48	Humorous	0.27	4.67
Sub-totals*	**4.89**	**3.21**		**4.62**	**2.48**		**0.27**	**4.67**
Total Level 1*	**Anne: 9.78**			**Ruth: 10.36**				
LEVEL TWO: MANAGING THE LESSON								
Imparting information			**Closed questions**			**Dead-end feedback**		
******	**A**	**R**		**A**	**R**		**A**	**R**
Framing	0.81	1.60	Cueing	2.99	9.37	Confirming	10.87	7.74
Linking	0.27	0.00	Establishing			Praising	4.62	7.01
Recapping	2.45	0.58	prior			Repeating	7.88	6.57
Motivating	0.00	2.04	knowledge	16.58	10.80	Negating	0.54	2.63
Directing	1.36	1.31						
Instructing	11.96	8.03						
Telling	5.98	9.49						
Sub-totals*	**22.83**	**23.05**		**19.57**	**20.17**		**23.91**	**23.95**
Total Level 2*	**Anne: 66.31**			**Ruth: 67.17**				
LEVEL THREE: MANAGING THE LEARNING								
Constructing understanding			**Open questions**			**Feedforward**		
******	**A**	**R**		**A**	**R**		**A**	**R**
Explaining	3.26	4.67	Inferential	5.70	2.63	Correcting	1.36	1.02
Connecting	1.09	1.02	Extending	1.36	1.02	Clarifying	3.26	3.36
Acknowledging	1.36	1.46	Challenging	1.36	1.46	Elaborating	0.54	2.19
			Metacognitive	3.53	1.60	Transferring	1.09	2.04
Sub-totals*	**5.71**	**7.15**		**11.95**	**6.71**		**6.25**	**8.61**
Total Level 3	**Anne: 23.91**			**Ruth: 22.47**				
TOTAL*	**Anne: 100.00**			**Ruth: 100.00**				
Total number of utterances	**Anne: 368.00**			**Ruth: 685.00**				

*** Expressed as percentages of total utterances per cycle for each teacher**

**** A = Anne : R = Ruth**

7.1.2 Changes in pedagogy

In Cycle Three, both Anne and Ruth had expressed the objective of increasing the proportion of their utterances at Level Three. In Cycle Two there had been an increase in the proportion of utterances at Level Two (at the expense of Level Three). Cycle Three saw a reversal of this. There were proportionately more utterances at Level Three for both teachers. A summary of the percentages of utterances at each level of the hierarchy in Cycles One, Two, and Three is provided in Table 7.2.

Table 7.2: Teacher utterances at each level of the hierarchy in Cycles One, Two, and Three*

	Anne			**Ruth**		
	Level One	**Level Two**	**Level Three**	**Level One**	**Level Two**	**Level Three**
Cycle One	13.37	67.09	19.54	7.77	72.14	20.09
Total number of utterances	389			528		
Cycle Two	12.57	77.24	10.19	7.93	76.82	15.25
Total number of utterances	334			492		
Cycle Three	9.78	66.31	23.91	10.36	67.17	22.47
Total number of utterances	368			685		

*** Expressed as percentages of total utterances per cycle for each teacher**

Utterances at Level One

The percentage of Level One utterances in Anne's class had decreased in Cycle Three, largely due to a decrease in behaviour management interactions (10.48% to 4.62%, see Table 7.3, p. 140).

> *Anne: Behaviour is not so much of an issue as the class is "tame," but I still seem to do quite a lot of reminding children of their responsibility to learn. Chatter is still constant.* ***(Reflection Day: Cycle Three)***

The percentage of utterances at Level One had slightly increased in Ruth's class, in the main because of an increase in the humorous exchanges she had with students (from 2.64% in Cycle Two to 4.67% in Cycle Three).

> *Ruth: I'm really enjoying this class - a lot of them get my silly jokes! I'm able to have a bit of fun with them. I've got some quick ones* [students in the class] *and I've got others, it just goes right over their head.* ***(Reflection Day: Cycle Three)***

Ruth's humour is illustrated with the following example.

> ***8/06/04 (Cycle Three/Observation Transcript/R/1)***
> *L: It needs a P in there.* [stifled giggles]
> *Ruth: L thinks we need a P in the middle of the word!* [laughter]

Utterances at Level Two

Once again the greatest proportion of utterances for both teachers was at Level Two of the hierarchy. However the teachers were relieved to discover that after the increase in the percentage of utterances at Level Two in Cycle Two, they had reverted to proportionately fewer than in Cycle One (see Table 7.2, p. 137).

> *Anne: I'm finding a huge difference this year. Because when I look through the transcripts I notice I'm getting into this level* [Level Two] *much quicker? And I'm actually getting down to here* [Level Three], *whereas last year I hardly got down there* [Level Three] *at all. I can move to Level Three more quickly giving less instructions, quicker interaction on the part of the students. They're more focused, less distractible.* ***(Reflection Day: Cycle Three)***

> *Ruth: I was really pleased to see an improvement from the last cycle. I didn't seem to be raving on as much.* ***(Reflection Day; Cycle Three)***

Anne and Ruth discussed reasons for the concentration of utterances at Level Two. They believed it to be partly an outcome of the students' learning needs.

> *Anne: I think it depends on what stage you're at in whatever you're teaching, how quickly you get to Level Three. You can't get to Level Three unless the foundations have been set. If you're just initiating something you need to spend quite a lot of time in*

Level Two. That's the basis of where you're going, and you can't skip straight into Level Three if that's your first lesson. ***(Reflection Day: Cycle Three)***

Ruth: *My class dynamic is vastly different to that of last year. There's no depth of knowledge. A lot of time seems to be spent organising, then managing, due to lack of experience, knowledge of children.* ***(Reflection Day: Cycle Three)***

These comments highlight the two-way process of teaching-learning interactions. As both teachers point out, it is impossible to achieve deep learning without sound foundations, or where there are gaps in students' understanding. Changes across cycles in instructing, telling, explaining, questioning, and feedback, have been summarized and compared in Tables 7.5, 7.6, and 7.7, and are discussed in later sections of this chapter.

Utterances at Level Three

After a sharp decrease in Cycle Two, both teachers were very relieved to discover that in Cycle Three the percentage of utterances at Level Three had increased to slightly above those in Cycle One (see Table 7.2, p. 137).

Anne: *I'm* ***really*** *pleased at the amount of time I was in Level Three, actually. After last time I really thought it would be way less than that. I was really worried.*

Ruth: *After last time! I'm* ***delighted*** *that I ended up in Level Three more often than I thought I would!*

7.1.3 Behaviour management

In Cycle Three there were proportionately fewer teacher utterances related to behaviour management in both classes. Changes in teacher utterances related to behaviour management across Cycles One, Two, and Three are presented in Table 7.3 (p. 140).

During the reflection day at the end of the cycle Anne suggested a link between tedious repetitive instructions and students' "switching off" and misbehaving, an indication that she was reflecting more deeply on the evidence in her transcripts.

Table 7.3: Teacher utterances related to behaviour management in Cycles One, Two, and Three *

	Anne	Ruth
Cycle One	6.94	0.76
Cycle Two	10.48	4.07
Cycle Three	4.62	2.48

*** Expressed as percentages of total utterances per cycle for each teacher**

7.1.4 Interactions with individual children

Anne and Ruth had both been very concerned about the uneven distribution of their attention to students in Cycle Two, and they had made an effort to interact more frequently with more students. A comparison of the number of teacher interactions with individual students in Cycles Two and Three is recorded in Table 7.4.

Table 7.4: Teacher interactions with individual students in Cycles Two and Three

	Anne		Ruth	
	Cycle Two	**Cycle Three**	**Cycle Two**	**Cycle Three**
Total number of students	34	33	33	31
Total number of interactions	334	368	492	68
Average number of interactions per student	9.82	11.15	14.91	22.10
Individual students with most interactions	W 28 J 28	K 27	C 73 H 56	S 65
Number of students with no interactions	5	2	9	3

In Cycle Three the average number of interactions per student had increased. Ruth was particularly pleased with the increase in her average number of interactions (from 14.91 to 22.10). In addition, both teachers were pleased to find that their attention had been slightly more evenly distributed. In Cycle Two both teachers had been shocked at the disproportionate amount of attention that particular individuals received at the expense of others with whom they did not interact at all. In Cycle Two, two students

in each class had received noticeably more teacher attention than the others. In Cycle Three only one student in each class dominated. However, Ruth was upset to find that this time S had been involved in 65 out of 685 interactions, and Anne was concerned that K had been involved in 27 out of 368 interactions. As in Cycle Two, the students who received the most attention were confident, "knowledgeable" students who volunteered answers to the closed questions that the teachers were using to direct the flow of their lessons.

Despite the fact that the numbers had decreased from Cycle Two, Anne and Ruth were unhappy to discover that there were still some students with whom they had not interacted at all in any of the five sessions (Anne, 2; Ruth, 3). Once again these students were quiet and undemanding, but not academically able. Although it was possible that the students were quietly "taking it all in," as Anne had claimed in the previous cycle, both teachers could see that the lack of interaction may have been putting the students at risk. They acknowledged that, at best, they had no indication of the students' understanding, and at worst, they may have been allowing them to "switch off" altogether.

7.1.5 Instructing, telling, and explaining

In Cycle Three, Anne had worked very hard to reduce the proportion of instructing in her utterances, and Ruth had made a similar effort to reduce the proportion of telling in hers. They were pleased to learn that they had achieved some success with their objectives. Anne had reduced her percentage of instructing (from 17.66 in Cycle Two to 11.96 in Cycle Three), and Ruth had reduced her percentage of telling (from 20.12 in Cycle Two to 9.49 in Cycle Three, see Table 7.5, p. 142).

Table 7.5: Instructing, telling, and explaining in Cycles One, Two, and Three*

	Anne			Ruth		
	Cycle One	**Cycle Two**	**Cycle Three**	**Cycle One**	**Cycle Two**	**Cycle Three**
LEVEL TWO						
Instructing	8.23	17.66	11.96	5.30	7.32	8.03
Telling	5.91	6.88	5.98	8.33	20.12	9.49
LEVEL THREE						
Explaining	5.66	1.80	3.26	5.87	3.59	4.67

*** Expressed as percentages of total utterances per cycle for each teacher**

Although both teachers were pleased to see a slight rise in the percentage of explaining in their transcripts, they were concerned that it still remained below what it had been in Cycle One.

> *Anne: I need to spend much less time giving instructions and turning them all off and get on with really **teaching** them something. I need to explain more to achieve outcomes. I need to constantly work at talking less and listening more carefully to children so as to follow their line of thinking.* ***(Reflection Day: Cycle Three)***

> *Ruth: Yes. As lessons progress I become aware of gaps and so we have to jump back and fill those. So I still get stuck on Level Two. I know I still talk too much. I have to keep on reminding myself to talk less and use questions to get children to think.* ***(Reflection Day: Cycle Three)***

7.1.6 Questioning

Despite their intentions both teachers had continued to ask a considerably higher percentage of closed questions than open questions in Cycle Three. The proportions of questions Anne and Ruth asked in each category, in each cycle, are presented in Table 7.6 (p. 143).

Table 7.6: Questions asked in Cycles, One, Two, and Three*

	Anne			Ruth		
	Cycle One	**Cycle Two**	**Cycle Three**	**Cycle One**	**Cycle Two**	**Cycle Three**
LEVEL TWO: CLOSED QUESTIONS						
Cueing/ Prompting	13.11	13.77	2.99	3.79	5.69	9.37
Establishing knowledge	5.14	10.48	16.58	10.98	14.63	10.80
Total%: Level Two	**18.25**	**24.25**	**19.57**	**14.77**	**20.32**	**20.17**
LEVEL THREE: OPEN QUESTIONS						
Inferential	4.88	3.59	5.70	2.65	2.23	2.63
Extending	0.26	0.00	1.36	1.52	0.41	1.02
Challenging	0.51	0.00	1.36	1.52	1.22	1.46
Metacognit-ive	0.51	0.00	3.53	0.76	0.81	1.60
Total: Level Three	**6.16**	**3.59**	**11.95**	**6.45**	**4.67**	**6.71**

*** Expressed as percentages of total utterances per cycle for each teacher**

Anne had managed to reduce the percentage of cueing utterances in her transcripts (from 13.77% in Cycle Two to 2.99% in Cycle Three), while increasing her percentage of closed questions to establish student's prior knowledge (from 10.48% in Cycle Two to 16.58% in Cycle Three). Ruth had increased her percentage of cueing (from 5.69% in Cycle Two to 9.37% in Cycle Three), while decreasing her percentage of closed questions to establish student's prior knowledge (from 14.63% in Cycle Two to 10.80% in Cycle Three).

Level Two Questions

Closed questions are often used by teachers to seek information or to avoid direct teaching (Mercer, 1995; Pressley & McCormick, 1995; Young, 1992), sometimes resulting in a tedious exchange of information that is confusing to students. The students who provide the correct responses, along with other students who know the answer and remain silent, learn nothing new. This method of presenting information assumes that all of the students who do not know the information are listening to their peers. Students who are not paying as much attention to the information provided by their peers as they might have if it had been provided directly by their teacher often

learn nothing at all. In many cases the teacher could directly present such information much more clearly and succinctly and use the time saved to develop ideas beyond basic knowledge. The following example from Anne's lesson on humpback whales illustrates the types of conversation that ensue when questions such as this are posed to seek information.

1/06/04 (Cycle Three/Observation Transcript/A/3)

Anne: What are barnacles that grow on these humpback whales? Without looking it up in the book … is there anyone who can tell us what barnacles are? … Where have you seen barnacles growing? What have they been on?

J: On rocks?

Anne: On rocks … and where are some places we can see them locally, … here, apart from the rocks?

B: Um, it might be on a shell?

Anne: On a shell, yes. On rocks. What else do they attach themselves to? Something that's been in the sea a long time

A: Um, the wharf?

Anne: The wharf, yes. … I wonder if the whales find it very comfortable. Swimming around with barnacles attached to your body.

K: They're big.

*Anne: Yes, they are big aren't they, in that picture? Can we just read what it says please K? … " Humpbacks can survive for 30 years or more. Barnacles often grow on their bodies. At least three different kinds of barnacles grow on the humpback whale". … So it's not just the one kind …**three** different kinds.*

At the end of this lengthy exchange, with an eventual reference to a book, it had been established that barnacles grow on objects under the sea, that they are big, and that three different kinds of barnacles grow on the humpback whale. However, to the confusion of many of the students, the original question of "What are barnacles?" had not been answered, and remained unanswered at the end of the lesson.

Level Three Questions

Effective questioning involves the use of open questions to encourage students to think beyond basic levels of knowledge and comprehension. Thought-provoking questions may be used to extend students' knowledge and thinking by challenging them to think more deeply or to come up with alternative ideas and solutions (van Boxtel, van der Linden, & Kanselaar, 2000).

Both teachers had increased their percentages of open questions (Anne from 3.59 % in Cycle Two, to 11.95% in Cycle Three, and Ruth from 4.67% in Cycle Two to 6.71% in Cycle Three) (See Table 7.6, p. 143). The following are examples of Level Three questions taken from the Cycle Three lesson transcripts.

Inferential questions to encourage students to think more deeply about the subject under discussion:

> ***11/05/04 (Cycle Three/Observation Transcript/A/1)***
> *Anne: How will their lives change do you reckon? What changes will they have to make? Is it going to be a different kind of life for them? … In what way?*

Questions to challenge students' thinking about a topic:

> ***11/05/04 (Cycle Three/Observation Transcript/A/1)***
> *Anne: Okay. All right. Now can you have* ***another think****? If you have a look at all those things, … all those ideas … what do you see that's the same?*

Metacognitive questions that serve to develop students' understanding of their own thinking and learning strategies:

> ***11/05/04 (Cycle Three/Observation Transcript/A/1)***
> *Anne: Why did you think that L?*

Both teachers were disappointed to learn that that they were still asking more closed questions than open questions, despite extensive discussion before the cycle commenced.

7.1.7 Feedback

Despite their efforts to develop and increase the percentage of feedback that they gave at Level Three, both teachers continued to give more feedback at Level Two than at Level Three across all three cycles. The types of feedback given by Anne and Ruth in each cycle are presented in Table 7.7 (p. 146).

Table 7.7: Feedback given in Cycles One, Two, and Three*

	Anne			Ruth		
	Cycle One	**Cycle Two**	**Cycle Three**	**Cycle One**	**Cycle Two**	**Cycle Three**
LEVEL TWO						
Confirming	9.77	8.38	10.87	9.47	8.54	7.74
Praising	6.94	5.69	4.62	13.07	5.28	7.01
Repeating	11.83	5.69	7.88	12.87	5.28	6.57
Negating	0.00	0.00	0.54	1.70	0.81	2.63
Total: Level Two	**28.54**	**19.76**	**23.91**	**37.11**	**19.91**	**23.95**
LEVEL THREE						
Correcting	2.06	0.00	1.36	1.52	0.41	1.02
Clarifying	3.08	1.80	3.26	2.84	3.66	3.36
Elaborating	1.80	1.20	0.54	2.27	0.41	2.19
Transfer	0.26	0.00	1.09	0.19	0.00	2.04
Total: Level Three	**7.20**	**3.00**	**6.25**	**6.82**	**4.48**	**8.61**

*** Expressed as percentages of total utterances per cycle for each teacher**

Level Two Feedback

Level Two feedback is the type used by teachers to respond to what students say without attempting to alter their thinking. This involves making explicit to students whether their understandings are accurate and that they are doing well, by confirming or praising their responses. Teachers also often repeat student utterances to ensure that others students have heard. Both teachers continued to have higher percentages of confirming, praising, and repeating (dead-end feedback) in their transcripts than any other category. The following rather tedious example from Ruth's discussion about encyclopaedia illustrates typical Level Two feedback.

8/06/04 (Cycle Three/Observation Transcript/R/1)
Ruth: What kinds of things would you have in an encyclopaedia?
B: Things about the world, and the Maoris, and sea, and stuff?
Ruth: Right ... The world, the Maoris, sea and stuff.
K: Space?
Ruth: *Yes, space and stuff.*
P: History?
Ruth: History. Yes.

W: *About war?*
Ruth: *About wars. Yes. Good boy.*

Teachers often avoid directly negating what students say, which sometimes results in confusion. The following excerpt is an example of this:

8/06/04 (Cycle Three/Observation Transcript/R/1)
Ruth: *Where would you find an encyclopaedia in the library? Please M?*
M: *In the fiction area?*
K: *In the fiction area? Some people might believe that. Um, H?*
H: *Non-fiction?*
Ruth: *In the non-fiction area.*

In this case, when questioned later, several students, including M, believed that encyclopaedia could be found in both the fiction and non-fiction sections of the library.

Level Three Feedback

The teachers were disappointed to discover that only a small percentage of their learning conversations involved high-quality, descriptive feedback (see Table 7.7, p.146). These findings were consistent with those of Knight (2003), although slightly more encouraging.

Teachers use Level Three feedback to make clear to learners what they need to know or do to improve their knowledge, understanding, or performance. Tunstall and Gipps (1996) refer to this as "constructing the way forward." Level Three feedback may also involve correcting incorrect propositions and elaborating on students' contributions to add to the depth of their understanding. Level Three feedback generally augments or alters students' thinking in some way. The following are examples of Level Three feedback, taken from the Cycle Three transcripts.

24/06/04 (Cycle Three/Observation Transcript/R/3)
Ruth: *Yes that's correct, but you need to have written down more key words so that we could get the full meaning. I knew what you meant P, but from those words that you gave me, someone else might not be able to understand. They might not have enough information.*

24/06/04 (Cycle Three/Observation Transcript/R/3)

K: *Tiritirimatangi has native kokako?*

Ruth: *Yes, but if I didn't know what a kokako was, or Tiritirimatangi, would I be confused? I would be. We might need to add something to that. Tiritirimatangi is what?*

K: *An island?*

Ruth: *An island. Do you think that if we really want the person to understand what they were reading we should add that in there?*

K: *You could have put … "the Maori bird, the kokako, is native to Tiritirimatangi Island".*

Ruth: *Yes. Is it a "Maori Bird" though? No. It's just a bird with a Maori name*

K: *You need to put … "The kokako bird is native to Tiritirimatangi Island".*

7.2 Teacher reflection

As in previous cycles at the end of Cycle Three, Anne and Ruth were released from their classrooms for a reflection day. The first half of the day was again devoted to discussing the coding of the observation transcripts, and comparison and cross checking of our analyses. During the second half of the day the teachers used their reflective journals along with their lesson transcripts to reflect on aspects of, and changes in, their pedagogy. In Cycle Three both teachers were much more specific in their reflection, and they were both much more self-critical than they had been in previous cycles. Our reflection and discussion during the reflection day covered the following topics; concerns about pedagogy, instructions, learning intentions and lesson planning, questioning and feedback, and professional development.

7.2.1 Concerns about pedagogy

When asked whether there was anything that they had seen in their transcripts that they were concerned about the following conversation ensued:

Anne: *I felt that lesson on the New Zealand Idol* [television talent quest] *was definitely boring. I'd assumed they'd all be interested, but some of them hadn't even seen it. Never assume*

interest! And I felt quite bored with it myself. I just didn't feel excited about it.

Ruth: *When you were watching it* [the programme], *or when you were doing it?* [the lesson]

Anne: *Both! I just didn't feel excited about New Zealand Idol, so that was probably why, but I thought they* [the students] ***would*** *be. And I felt it was a bit of flop, whereas usually in language they're really motivated and go for it. But that was probably because my feelings about the whole thing were being transmitted. I really noticed how boring some aspects of it were. I'm sure I'm turning them off half the time.* ***(Reflection Day: Cycle Three)***

Here Anne is demonstrating her developing ability to analyse and critique her own practice. She had quite accurately evaluated that particular lesson as unmotivating, due partly to her own lack of interest in the topic, and partly to the fact that she had misread the students' interest.

Ruth also demonstrates more insight and objectivity concerning her practice, both positive aspects:

Ruth: *But that's interesting, too, because when you think about what you actually teach in class, when you get passionate about a particular subject, like poetry's always a goody, and so the lessons always appear to me to go really well, because you're so enthusiastic yourself.* ***(Reflection Day: Cycle Three)***

and negative aspects:

Ruth: *I was surprised at the amount of time we spent on this little warm-up activity. It just takes forever to happen! I've got about four pages of this! How dull and boring that is! I was quite surprised to find out how long it took to do what I considered a really short thing, when you look at it written down on paper. The bulk of the lesson was taken up with doing that! And I confused everybody. I don't know. I think I'm really all over the place.* ***I*** *didn't understand what I'd said! I thought, what a shocking thing to see. I wasn't happy with what I'd done.* ***(Reflection Day: Cycle Three)***

Ruth has identified aspects of her lessons that are not particularly constructive and that waste valuable learning time. She has also accurately pinpointed the difference in her pedagogy when she is "passionate" about a subject.

7.2.2 Instructions

Anne discussed her tendency to repeat instructions unnecessarily, and to interrupt the class in anticipation that they need redirection, rather than waiting to single out individuals who indicate need.

> *Anne: I actually wrote that in one of my reflections, I start giving instructions, and then I get sidetracked, and then I give too many instructions at once. I tend to rabbit on, and it's quite apparent in some of the transcripts, I've got instructions in the middle of talking about other things, and of course they're not going to get it. I know that I do that. I haven't allowed enough time for them to even assimilate it and get started before I repeat it. I tend to catch a few kids who are obviously a bit glassy eyed, and before it gets to be a stage where there might be others I pick up and redirect. I call it redirecting, but I can see how it must be boring for the kids who have got it, it must make them switch off. And then they misbehave of course.* ***(Reflection Day: Cycle Three)***

Ruth identified the effect that her impatience has on the progression of her lessons, and that she often allows too little time for students to absorb information or instructions.

> *Ruth: And I send the children away to do the activity without giving them enough time to actually get there. Right you've had two minutes, that's great, now everybody stop! And they've not actually had enough time to absorb the information, and I don't know why that is, whether it's because I don't like the noise level. I don't seem to be allowing them enough time to actually make a decision.* ***(Reflection Day: Cycle Three)***

7.2.3 Learning outcomes and lesson planning

When asked whether my request for them to share the learning outcomes with their students for each observed lesson had affected their practice, the teachers made the following comments:

Anne: It's made me connect to the learning outcomes more consciously during the lessons and refer children to reasons for doing what they're doing. It's made me really think about what I want them to learn, instead of what we're going to be doing. ***(Reflection Day: Cycle Three)***

Ruth: The process of having to think about my purpose of the lesson was taxing. I'd got out of the practice of being specific. But it did make me focus more on what I was actually trying to achieve, instead of going through the motions like you do sometimes. It's made me much more conscious of time-wasting activities. ***(Reflection Day: Cycle Three)***

Both Anne and Ruth acknowledged that their teaching had lacked a specific focus on learning, and that being asked to share the learning outcomes had forced them to think more carefully about each lesson, and to plan for student *learning* as opposed to activities to keep students busy.

However, in the following conversation they also both pointed out the need for flexibility in their planning and pedagogy.

Anne: But you often have a lesson planned, and this idea of where you want to go, and sometimes you actually get there. But it often depends on the kids. Sometimes it falls over, and sometimes it doesn't. You have the big picture in your mind where your lesson's going. But then you're always open to change. And I seldom end up going along the course that I plan. I might end up at place I want to go, but I never seem to take the route that I've got planned in my mind. There's usually some major teaching point to follow that might have a bigger impact on the kids,

Ruth: Well that actually happened a couple of times [in the observed lessons]. *There was a classic one in a lesson where they had to talk about their favourite animal, but some of them didn't know what an animal was. There were big arguments, big discussions. It was hilarious. Is a cat an animal miss? How can you not know that? - I thought to myself. So we had to go back and have a little biology lesson, you know? There was life, and there were animals, and these are some of the animals that there were. They were horrified that* ***we*** *were animals. But when you think about it, they learned far more from that, that discussion on the "order of things," than they would've if we'd just spent the whole time on the other stuff.*

Anne: Yes, because you'd have probably stepped over a very serious gap in their learning if you'd gone on where you wanted to go. That's my problem too, making assumptions about what they know, or understand, or are interested in.

Ruth: Yes. I was completely taken aback that, not all of the children, but some of them, didn't actually know that a cat was animal. I'd just made an assumption that they knew. ***(Reflection Day Cycle Three)***

Here Anne and Ruth acknowledge the importance of altering the direction of a lesson to accommodate learning needs that become apparent as the lesson progresses. This process of intervening as teaching and learning are occurring, to respond to students' learning needs, is a part of formative assessment (Bell & Cowie, 1997, 2001; Black, 1993; Black & Wiliam, 1998a). Sometimes, as both teachers correctly point out, the learning that occurs in such situations is more important than what was originally planned.

7.2.4 Questioning and Feedback

When asked whether they felt that they had achieved their goals related to questioning and feedback Anne made the following comment.

Anne: Questioning is something you really have to think carefully about. You've got to find out what they know first of all. And then you've got to connect what they know to what you want to introduce, and take them that step, then you've got to redirect when they've got so far and don't know how to go further, and then when you get to that stage you've got to challenge them and extend them. So there's really a pattern, a progression that you learn to do subconsciously. And you recognize the stages as you get there. And it's something that you do that you take for granted, and when you see student teachers not doing it, you think, "Oh, big gap!" ***(Reflection Day: Cycle Three)***

In this statement Anne has demonstrated developing awareness of her tacit knowledge, or underlying assumptions and routines of action. According to Altrichter, Posch, and Somekh (1993), this important step in the development of reflection-on-action is contingent upon the ability to distance oneself from one's actions. Altrichter,

Posch, and Somekh suggest that tacit knowledge may be activated through a number of methods that were central to our action research process, including introspection (in diary or journal entries), interviews or conversations with a critical friend, and "reading one's own actions" (p. 48) or reviewing an action from a fresh perspective. Anne's ability to articulate the "stages" or "progression" in her questioning was an encouraging indication of the development of her reflective capacity during the course of the action research.

The teachers also discussed each other's transcripts, comparing their lessons and providing each other with constructive feedback. This was encouraging evidence of an emerging community of practice.

> *Ruth: You're much better at asking good questions than me. I really noticed that in your transcripts. I know I don't ask enough questions, deeper ones anyway. I still talk too much. And I'm too impatient. Don't give them time to think. And I was really unhappy about the kind of feedback I was giving them. Too much "Yes, yes. That's right. Good boy." And repeating what they say all the time! Not enough Level Three feedback by any means. I'm reasonable at explaining, but that's about it!* ***(Reflection Day: Cycle Three)***

> *Anne: Your lessons are interesting though. I seem to ask quite a lot of questions, even at Level Three. I was quite pleased about that, but I really need to work on the feedback aspect, too much low-level stuff. I do more "repeating" than you, and confirming, "Yes that's right," kind of thing. I seem to be getting worse, than Cycle One anyway, not better, in spite of my good intentions.* ***(Reflection Day: Cycle Three)***

7.2.5 Professional Development

When I asked the teachers how they felt the research was contributing to their professional development, and whether they thought it was making a difference to their interactions with students they had the following to say.

> *Anne: It's made me much more conscious of trying to ask better questions, give clearer instructions, so that I don't have to repeat them over and over and lose them* [students' attention].

And give them time to do it, so that it builds into independent learning. And wait time. And listen to kids. Actually listen to what they're saying. And I think this [points to hierarchy] *makes me more conscious because it's so specific. When you see it tabled like that. And there are times when you think you're not being very effective at all. One of the questions I keep asking myself now is "Have I changed anything?"*

Ruth: On reading ***my*** *transcripts it strikes me as incredible that the children learn anything at all. My statements are all mixed up - not complete - don't make sense. I know I'm too impatient. I don't give them enough time to think. And I don't ask nearly enough searching questions. I've noticed that in the transcripts. Even though that's what we set out to do at the beginning of this cycle. I'm really getting into analysing what I do now. I do keep asking myself, "Where am I going?" "What am I doing?" "Are they really learning anything?" I hope it's making a difference, but I can't really see it yet.* ***(Reflection Day: Cycle Three)***

For the first time both Anne and Ruth were articulating deliberate attempts to monitor and question their behaviour *during* their teaching, an indication that they were developing greater proficiency in reflection-in-action (Schon, 1983).

7.3 Researcher reflection

At the end of Cycle Three, I was encouraged at the progress we had made. Anne and Ruth were able to analyse and reflect on their practice much more effectively than they had in the previous two cycles. They had reached the stage where they were starting to critique their practice independently. They had also become much more objective, and more deeply critical of their own pedagogy. The teachers were now examining more closely the teaching and learning that was occurring in their transcripts, and making direct links between their own practice and what they had found in the readings. They were also both directly linking their personal interactions with students with the Hierarchy of Classroom Interactions. In addition, they were also now consciously monitoring their behaviour during their teaching, an indication that they were developing the ability to engage in reflection-in-action (Schon, 1983, 1987).

I had initially hoped that by this stage of the research process the control and management of the research would have passed to the teachers, to the point where they would be able to collect and analyse their own data in the final cycle. However, at the time both Anne and Ruth were under considerable pressure in their personal lives, Anne in particular. Rather than ask them to undertake added workload and responsibility, which might compromise their roles as classroom teachers (Day, 1999; Elliott, 1991), I chose to continue with the procedures used in the previous cycles.

Nevertheless by the end of Cycle Three, Anne and Ruth were beginning to share control of the research process. At this point we had established an emergent community of practice (Craft, 2000; Day, 1999; Poskitt, 2005), in which the teachers were working collaboratively to improve their practice by reading and discussing each other's transcripts, comparing their pedagogy, and providing each other with constructive criticism. They were also taking a much more proactive role in developing and answering meaningful research questions. Anne and Ruth were now able to pinpoint and articulate specific areas of their pedagogy that they wished to investigate and improve.

7.4 New questions

For the next and final research cycle, Anne and Ruth were keen to focus exclusively on the amount and quality of teacher talk, questioning, and feedback that they were giving to students. With this in mind I provided them with three readings, to be read and discussed during the student vacation. The first reading was a brief section of *Critical Theory and Classroom Talk* (Young, 1992) entitled *When is a Question not a Question?* This examines the ways in which teachers disguise statements as questions, or use closed questions, to manipulate the flow of their lessons. The second reading was a chapter entitled *Classroom Interactions*, by McGee (2001), which examines teacher-student interactions and discusses several different "systems" of teacher questioning, including questioning based on Bloom's Taxonomy. The third reading, *Scaffolding: A Powerful Tool in Social Constructivist Classrooms*, by Roehler and Cantlon (1997), discusses different types of scaffolding, including modelling, questioning, explaining, and clarifying. I also asked them to reread and reconsider the

article on feedback *Teacher Feedback to Students in Numeracy Lessons: Are Students Getting Good Value?* (Knight, 2003), that I had provided at the beginning of Cycle Two.

At the end of Cycle Three the teachers developed the following questions that they wished to investigate in the final research cycle:

- Are we able to reduce repetitive instructions and increase the amount of Level Three teacher talk (explaining)?
- Are we able to increase the number of Level Three questions (open-ended) that we ask students?
- Are we able to increase the amount of Level Three feedback (feedforward) that we give to students?

CHAPTER EIGHT

CYCLE FOUR: TERM THREE 2004

Being able to see a record of what I was doing, and not doing, in the transcripts made it so clear, and you don't normally have that opportunity. The hierarchy spelled it out, and helped with the analysis. Having time, you know, over nearly two years, to really think about aspects of what I was doing. The readings, working together, the discussion, especially on the reflection days, where sometimes things fell into place when we talked about them. (Anne: Reflection Day, Cycle Four)

I know I'm asking better questions. I think the work we did on Bloom's Taxonomy really helped me with that. And I'm making my outcomes more specific because I'm sharing them with the children. I'm not talking as much - probably more aware of "time-wasters."(Ruth: Reflection Day, Cycle Four)

Cycle Four was undertaken in Term Three, 2004. As this was to be the final action research cycle in the study, Anne and Ruth saw it as a last chance to effect and monitor changes in their teaching practice. They had narrowed their focus of interest to the heart of learning conversations, teacher talk, questioning, and feedback. Because they had both been somewhat disheartened by the lack of real change or development throughout the first three action research cycles, they were eager for the chance to read and discuss as much material about learning conversations as possible before the cycle commenced.

At the end of Cycle Three, I had provided the teachers with three readings. The first was a copy of a small section from *Critical Theory and Classroom Talk* (Young, 1992) entitled *When is a Question Not a Question?* The second reading was *Classroom Interactions* (McGee, 2001), which discusses teacher questioning in relation to Bloom's Taxonomy, and also provides a classification for questioning that is compatible with the Hierarchy of Classroom Interactions. The third reading was *Scaffolding: A Powerful Tool in Social Constructivist Classrooms* (Roehler & Cantlon, 1997), which discusses different types of scaffolding, including modeling,

questioning, explaining, and clarifying. The teachers read and made written reflections on these readings during the first week of the student vacation, and during the second week of the vacation, before the commencement of Cycle Four, we met for a day to discuss them in depth. We re-examined the transcripts from the previous cycle in the light of the readings, and our discussion focused on the use of open questions to encourage higher order thinking.

During the cycle, I provided two additional articles for the teachers to read and reflect upon. The first was *Are There Any Questions?* (Croom, 2004), and the second was *What Questions Do You Have? In Defence of General Questions: A Response to Croom* (Olson & Clough, 2004). These articles in turn criticise and defend the use of general "call-out" questions in providing diagnostic information and engaging students in learning. The teachers also wrote written reflections on these articles. The teachers' reflections on all five readings are summarised in Table 8.6, which is presented in section 8.2.1 of this chapter.

In Cycle Four the teachers again planned to read and comment on each other's lesson transcripts and to keep individual reflective journals. The questions that they wished to investigate in Cycle Four were as follows:

- Are we able to reduce repetitive instructions and increase the amount of Level Three teacher talk (explaining)?
- Are we able to increase the number of Level Three (open-ended) questions that we ask students?
- Are we able to increase the amount of Level Three feedback (feedforward) that we give to students?

In Cycle Four, I sought further information in relation to the original, or second order research questions, regarding the effects of the professional development aspect of the action research process on the teachers' thinking and practice:

- What factors influence the quality of learning conversations in classrooms?
- What changes occur in teachers' knowledge and thinking as a result of reflective professional development?
- What changes occur in teachers' practice as a result of reflective professional development?
- What changes occur in learning conversations as a result of reflective professional development?

8.1 Classroom observations

As in the previous three cycles, during Cycle Four, I observed and recorded five one-hour sessions in each classroom. The purpose of the observations was to provide answers to the teachers' personal questions, to gather further information about the factors that influence classroom conversations, and to monitor changes in the teachers' classroom practice. The observations once again followed the procedures developed in previous cycles (see Chapter 5, Section 5.2).

The following section of this chapter provides information on the categorisation of teacher utterances according to the Hierarchy of Classroom Interactions, along with changes from Cycles One, Two, and Three. In relation to the research questions that guided this cycle, information is provided regarding instructing, telling, explaining, questioning, and feedback.

8.1.1 Categorisation of teacher utterances

As in the previous three cycles, during the first half of the teacher reflection day we used the hierarchy of classroom interactions to discuss, compare, and cross check our coding of the observation transcripts, in order to develop a shared interpretation of the teacher utterances in each transcript. The overall percentages of teacher utterances in each category and each level of the Hierarchy of Classroom Interactions in Cycle Four are summarised in Table 8.1 (p. 160).

Table 8.1: Categorisation of teacher utterances in Cycle Four*

LEVEL ONE: MANAGING THE CLASSROOM								
******	**A**	**R**		**A**	**R**		**A**	**R**
Administration	3.13	2.02	Managing			Personal/		
Routine	1.57	0.89	behaviour	3.13	0.22	Humorous	0.63	2.46
Sub-total*	**4.70**	**2.91**		**3.13**	**0.22**		**0.63**	**2.46**
Total Level 1	**Anne: 8.46**			**Ruth: 5.59**				
LEVEL TWO: MANAGING THE LESSON								
Imparting information			**Closed questions**			**Dead-end feedback**		
******	A	**R**		**A**	**R**		**A**	**R**
Framing	5.33	0.67	Cueing	6.27	9.62	Confirming	7.84	8.28
Linking	0.00	0.00	Establishing			Praising	4.70	5.37
Recapping	4.08	2.68	prior			Repeating	4.39	4.70
Motivating	3.45	8.05	knowledge	9.09	6.49	Negating	3.76	4.47
Directing	2.19	2.01						
Instructing	8.15	6.49						
Telling	5.33	7.16						
Sub-total*	**28.53**	**27.06**		**15.36**	**16.11**		**20.69**	**22.82**
Total Level 2	**Anne: 64.58**			**Ruth: 65.99**				
LEVEL THREE: MANAGING THE LEARNING								
Constructing understanding			**Open questions**			**Feedforward**		
******	**A**	**R**		**A**	**R**		**A**	**R**
Explaining	3.13	4.92	Inferential	5.66	2.69	Correcting	0.94	2.02
Connecting	0.31	0.00	Extending	2.19	1.34	Clarifying	4.39	5.59
Acknowledging	2.19	1.12	Challenging	3.45	4.92	Elaborating	1.57	2.24
			Metacognitive	3.13	3.58	Transferring	0.00	0.00
Sub-total*	**5.63**	**6.04**		**14.43**	**12.53**		**6.90**	**9.85**
Total Level 3	**Anne: 26.96**			**Ruth: 28.42**				
TOTAL	**Anne: 100.00**			**Ruth: 100.00**				
Total number of utterances	**Anne: 319.00**			**Ruth: 447.00**				

*** Expressed as percentages of total utterances for each teacher**

**** A = Anne : R = Ruth**

8.1.2 Changes in pedagogy

The percentages of utterances at each level of the Hierarchy of Classroom Interactions in all four cycles are presented in Table 8.2. In Cycle Four both Anne and Ruth had made further progress towards their objective of increasing their percentage of utterances at Level Three.

Table 8.2: Teacher utterances at each level of the hierarchy in Cycles One, Two, Three, and Four*

	Anne			Ruth		
	Level One	**Level Two**	**Level Three**	**Level One**	**Level Two**	**Level Three**
Cycle One	13.37	67.09	19.54	7.77	72.14	20.09
Total number of utterances	389			528		
Cycle Two	12.57	77.24	10.19	7.93	76,82	15.25
Total number of utterances	334			492		
Cycle Three	9.78	66.31	23.91	10.36	67.17	22.47
Total number of utterances	368			685		
Cycle Four	8.46	64.58	26.96	5.59	65.99	28.42
Total number of utterances	319			447		

*** Expressed as percentages of total utterances for each teacher**

Utterances at Level One

In Cycle Four, the percentage of utterances at Level One for both teachers was lower than it had been for all other cycles (see Table 8.2). This prompted the following comment from Anne during the reflection day.

> *Anne: In general I'm quite happy with that. I think it's having fewer interruptions that's made the most difference here for me, and the class is easier to manage than last year, so there's not quite as much "behaviour management," though I still seem to do miles more than you.* ***(Reflection Day: Cycle Four)***

Utterances at Level Two

In Cycle Four, the teachers were pleased to find that there was a slight reduction from Cycle Three in their percentage of utterances at Level Two, and that these continued to be more evenly distributed (see Table 8.2, p. 161).

> *Anne: I spend most of the time in and out of Level Two - sometimes get to Level Three, and sometimes back to Level One. Recapping, repeating, reconstructing, cuing, prompting, connecting, are all happening okay, I'm relieved that I seem to be getting the instructing under control. I've really worked hard on that not to talk* ***at*** *them* [instructing] *too much. I could see in Cycle Two how boring some of it was.* ***(Reflection Day: Cycle Four)***

> *Ruth: Yeah. I'm not talking* ***at*** *them* [telling] *as much either, thank goodness. I was shocked at some bits* [in Cycle Two], *it gave me a real fright. I've really tried this time, listened to myself, and tried to get down to the nitty-gritty of a lesson as quickly as possible. I know I tend to waste a lot of time on low-level stuff if I don't watch it. That's where good questioning is so important.* ***(Reflection Day: Cycle Four)***

Utterances at Level Three

In Cycle Four, Anne and Ruth were gratified that their utterances at Level Three had risen a little further from Cycle Three (see Table 8.2, p. 161). During the reflection day the teachers made the following comments.

> *Ruth: I'm definitely asking more and better questions, digging deeper, making them think about things more deeply, and talking less and listening more I guess. I do like to see that I'm challenging their thinking a reasonable amount. I think that's really important not just to accept any old answer, to dig deeper. When a teacher asks a closed question and a child answers it, then the learning stops. Asking open-ended questions - moving children along to deeper levels - is very important.* ***(Reflection Day: Cycle Four)***

> *Anne: I'm developing a pattern where I seem to be encouraging deeper thinking, once we start discussing. We seemed to move more quickly to Level Three in this cycle, with a better balance*

of questioning and feedback. It progressed to challenging, elaborating, and clarifying, it's good to get to Level Three more quickly, the learning becomes more student driven and centred there. ***(Reflection Day: Cycle Four)***

8.1.3 Instructing, telling, and explaining

One of the objectives the teachers set for Cycle Four was to reduce the percentage of repetitive instructions and telling, and increase the percentage of explaining in their interactions with students. Proportions of instructing, telling, and explaining across all four cycles are summarized in Table 8.3.

Table 8.3: Instructing, telling, and explaining in Cycles One, Two, Three, and Four*

	Anne				Ruth			
	Cycle One	**Cycle Two**	**Cycle Three**	**Cycle Four**	**Cycle One**	**Cycle Two**	**Cycle Three**	**Cycle Four**
LEVEL TWO								
Instructing	8.23	17.66	11.96	8.15	5.30	7.32	8.03	6.49
Telling	5.91	6.88	5.98	5.33	8.33	20.12	9.49	7.16
LEVEL THREE								
Explaining	5.66	1.80	3.26	3.13	5.87	3.66	4.67	4.92

*** Expressed as percentages of total utterances per cycle for each teacher**

After being really shocked at the increase in the proportion of telling in her transcripts in Cycle Two, Ruth had succeeded in reducing this in Cycle Three, and there was a further decrease in Cycle Four. After the increase in the proportion of repetitive instructions in her transcripts in Cycle Two, Anne had worked successfully to reduce this in Cycle Three, and again in Cycle Four. The teachers were gratified that their efforts had brought about these small improvements. However they were disappointed that the proportion of explaining for both teachers had actually decreased across the four cycles.

Although the proportion of explaining Anne and Ruth did had changed very little from Cycle Three, many of their explanations showed greater depth and quality. The

following are examples of their ability to answer students' questions effectively and to give accessible and coherent explanations.

9/09/04 (Cycle Four/Observation Transcript/R/2)

Ruth: *Now what do we do when we find information we want to use in a book, or on the Internet?*

K: *Write it down?*

K: *Why do we need to change the words?*

M: *So you're not copying?*

Ruth: *Not copying. … Plagiarism. That's the* ***correct*** *word. You can't* ***do*** *that! … At university if you do that you fail that course. … That reporter we talked about a couple of weeks ago, who copied somebody's article off the Internet, and wrote it pretty much the same, and called it her own, got into* ***big*** *trouble. … You cannot take somebody else's info and put your name to it. It's stealing that person's ideas, just like if you stole their money! … You have to put it in your* ***own*** *words,* ***and*** *acknowledge where you got the idea from.*

17/08/04 (Cycle Four/Observation Transcript/A/2)

B: *What are these people doing?*

Anne: *Well, these are* ***water*** *jars,and they're* [Egyptian workers] *tossing them. See they've formed a chain? It's how they move the jars from one place to another. They must be very good catchers, and very sure that they are going to catch them. I guess it's instead of a trolley, or a modern conveyor belt. It's work, employment, that uses quite a few people, I wouldn't imagine they get paid very much, but it's still a job.*

During the reflection day both teachers talked about deliberately monitoring their instructing, telling, and explaining, during their teaching, an indication of the continuing development of their ability to reflect-in-action.

Anne: *Because we've noticed that I tend to give repeated instructions, and the kids tune out, I really worked on that. I needed to work at less talking, to articulate more concisely. I need to let* ***them*** *find out what they need to know once they are set in the direction of the task. I tried to treat the initial working time as an equivalent to "wait time" with questioning, to give them more of a chance to get started on their own and have a go at their own thinking. I was really pleased that I had made quite a difference there, - or I thought so anyway.* ***(Reflection Day: Cycle Four)***

*Ruth: Yeah. I've worked **really** hard at keeping my level of talking down, not telling them too much, raving on - to ask more pertinent questions. I'm quite pleased really. I do seem to be getting better. I find I'm constantly reminding myself.* ***(Reflection Day: Cycle Four)***

8.1.4 Questioning

From Cycle Three to Cycle Four the teachers had succeeded in their efforts to reduce the percentage of Level Two questions and increase the percentage of Level Three questions in their transcripts. Questions asked across all four cycles are summarized in Table 8.4.

Table 8.4: Questions asked in Cycles One, Two, Three, and Four*

	Anne				Ruth			
	Cycle One	**Cycle Two**	**Cycle Three**	**Cycle Four**	**Cycle One**	**Cycle Two**	**Cycle Three**	**Cycle Four**
LEVEL TWO: CLOSED QUESTIONS								
Cueing/ Prompting	13.11	13.77	2.99	6.27	3.79	5.69	9.37	9.62
Establishing knowledge	5.14	10.48	16.58	9.09	10.98	14.63	10.80	6.49
Total: Level Two	**18.25**	**24.25**	**19.57**	**15.36**	**14.77**	**20.32**	**20.17**	**16.11**
LEVEL THREE: OPEN QUESTIONS								
Inferential	4.88	3.59	5.70	5.66	2.65	2.23	2.63	2.69
Extending	0.26	0.00	1.36	2.19	1.52	0.41	1.02	1.34
Challenging	0.5 1	0.00	1.36	3.45	1.52	1.22	1.46	4.92
Metacognitive	0.51	0.00	3.53	3.13	0.76	0.81	1.60	3.58
Total: Level Three	**6.16**	**3.59**	**11.95**	**14.43**	**6.45**	**4.67**	**6.71**	**12.53**

***Expressed as percentages of total utterances per cycle for each teacher**

Both teachers were particularly pleased that they had managed to increase the proportion of open questions that they asked.

In Cycle Four, Anne asked inferential questions such as:

17/08/04 (Cycle Four/Observation Transcript/A/2)

Anne: *Would we see that* [workers forming a human chain] *here, do you think? In New Zealand? Would New Zealanders be prepared to do a job like that? For probably not much money?*

K: *No*

Anne: *No? Why not? Do you think? Why* ***wouldn't*** *New Zealand workers be willing to do that kind of thing?*

Anne also asked metacognitive questions to assist students with monitoring their use of learning strategies.

10/08/04 (Cycle Four/Observation Transcript/A/1)

Anne: *So why are we going to mind-map? This is a skill you can use for the rest of your lives and your learning. Why do we mind map?*

D: *You're thinking about how things connect?*

Anne: *Yes, you are, and what else are you doing?*

F: *Finding out where they belong?*

Anne: *Yes. You've got your key words, and now you're going to organise them so you can answer the big question at the top of the page. … so we're going to mind-map them now.* ***How*** *are we going to do that?*

The following is an example of the type of questioning Ruth used to challenge and extend students' thinking.

31/08/04 (Cycle Four/Observation Transcript/R/1)

Ruth: *Yes, but what's a better way to describe the* ***kind*** *of proud, the* ***kind*** *of happy?*

The following comments from the teacher reflection day indicate that Anne and Ruth had developed a clearer focus on specific aspects of their pedagogy. In addition, they were evaluating their own performance in terms of the goals that they had set themselves.

Anne: *I noticed patterns with various stages of questioning. I still seem to ask a lot of convergent* [closed] *questions, to lead children to a line of thinking, Level Two, but not as many as before. As you move through the inquiry process more and more questions should be divergent* [open]*, to probe and trigger deeper levels of thinking. This was one of my teaching*

targets to achieve. I certainly think I've made progress there, across the cycles. Another target was to allow wait time at certain points - I'm getting better, but sometimes it's a matter of balance between knowing how students are coping, when they need support or the opportunity to rethink. ***(Reflection Day: Cycle Four)***

Ruth: Yeah. My focus here was asking more questions altogether, but especially Level Three. I was relying too heavily on the "with-it" children that I have. My questioning wasn't great. I was directing the answer, the lesson still, - some of the time. Looking at the transcripts I noticed that my questioning's getting better. My questions are getting more pointed. I seem to ask more challenging questions. I'm pleased about that, that I'm challenging their thinking. ***(Reflection Day: Cycle Four)***

8.1.5 Feedback

Overall, the percentage of feedback at Level Two for both teachers had decreased across the four cycles (see Table 8.5, p. 168). Disappointingly however, Ruth's total percentage of Level Three feedback had increased only slightly, (from 6.82% in Cycle One, to 9.85% in Cycle Four) and Anne's had actually decreased slightly (from 7.20% in Cycle One, to 6.90% in Cycle Four).

During the Cycle Four reflection day the teachers had the following comments to make about their Level Three feedback:

Anne: I feel like I've just been barely holding my own here. I'm doing a wee bit more clarifying. I used to be a bit scared to point out to children that their thinking was wrong - all that "positive reinforcement" stuff. You feel you have to be positive all the time. You get brainwashed. But when you see it in writing, in the transcripts, where you haven't corrected faulty thinking, you see how confusing it is for everyone. It's not helpful at all. It's really important to clarify thinking and reset direction, put them back on the right track. ***(Reflection Day: Cycle Four)***

Table 8.5: Feedback given in Cycles One, Two, Three, and Four*

	Anne				Ruth			
	Cycle One	**Cycle Two**	**Cycle Three**	**Cycle Four**	**Cycle One**	**Cycle Two**	**Cycle Three**	**Cycle Four**
LEVELTWO								
Confirming	9.77	8.38	10.87	7.84	9.47	8.54	7.74	8.28
Praising	6.94	5.69	4.62	4.70	13.07	5.28	7.01	5.37
Repeating	11.83	5.69	7.88	4.39	12.87	5.28	6.57	4.70
Negating	0.00	0.00	0.54	3.76	1.70	0.81	2.63	4.47
Total: Level Two	**28.54**	**19.76**	**23.91**	**20.69**	**37.11**	**19.91**	**23.95**	**22.82**
LEVEL THREE								
Correcting	2.06	0.00	1.36	0.94	1.52	0.41	1.02	2.02
Clarifying	3.08	1.80	3.26	4.39	2.84	3.66	3.36	5.59
Elaborating	1.80	1.20	0.54	1.57	2.27	0.41	2.19	2.24
Transferring	0.26	0.00	1.09	0.00	0.19	0.00	2.04	0.00
Total: Level Three	**7.20**	**3.00**	**6.25**	**6.90**	**6.82**	**4.48**	**8.61**	**9.85**

***Expressed as percentages of total utterances per cycle for each teacher**

This comment reveals Anne's recognition of the "praise culture" discussed by Torrance and Pryor (1998), and the negative effects that it has on learning (Hattie, 2001; Hill & Hawk, 2000; Wiliam, 1999). In addition, the written transcripts of her teaching have allowed her to recognise the confusion that arises when she fails to correct "faulty thinking."

Ruth has also recognised the confusion experienced by students when she allows "things to go far too long without sorting them out."

> *Ruth: Mmm. It's no wonder kids get confused sometimes. In some of my transcripts I can see that I've let things go far too long without sorting them out. It's about letting kids have their say, too, sometimes, encouraging them to participate. But if you don't jump in and sort it out things can get out of hand. This process has really made me aware of that, it isn't something you're generally so aware of, because you don't usually have a running record of your lessons, and all that stuff gets lost in the blur.* ***(Reflection Day: Cycle Four)***

After four cycles of research it was encouraging to hear from both teachers that providing them with written transcripts of their lessons had ultimately achieved the intended purpose of making their pedagogy explicit. We had finally reached the point where Anne and Ruth were able to independently use their transcripts to critique their practice in relation to the professional readings and discussion.

8.2 Practical significance of the research findings

As previously mentioned, the raw data generated in this study was not suitable for calculating statistical significance (see Section 5.2.3). However, in order to determine the importance of the changes in the teachers' practice that had eventuated from the action research process, some further analysis was required. Accordingly at the end of Cycle Four, I compared the baseline data from Cycle One with the data from Cycle Four, in order to determine the *practical significance* of the professional development process.

In educational research, according to Gall (2001):

> The term "practical significance" implies a research result that will be viewed as having importance for the practice of education, or in other words, … viewed as important by teachers, school administrators, policy makers, and others concerned about the day-to-day workings of education and efforts to improve it (p. 2).

The practical significance of educational research is frequently calculated and reported as effect sizes. Effect sizes can be useful in judging the importance of qualitative research results when the study includes an outcome measure of some kind (Gall, 2001). For this reason they may be used to determine whether an intervention, such as the present action research process, has made an important difference in the learning of an individual or group. Effect sizes provide information about the magnitude of difference. There are many different ways to measure effect sizes. The measure used in the present study was Cohen's d (1988), which measures effect sizes in standard deviation units (small effect d=.20, medium effect d=.50, and large effect d=.80).

A comparison of the proportions of each teacher's utterances at each level of the Hierarchy of Classroom Interactions in Cycles One and Four found a small effect size for both teachers (Anne .22, and Ruth .20). Comparisons of proportions of teacher utterances are summarised in Table 8.6.

Table 8.6: Comparison of proportions of teacher utterances at each level of the hierarchy in Cycles One and Four*

	Level	Percentage of utterances*		Effect size (Cohen's d)
Anne		Cycle 1 (*N*=389)	Cycle 4 (*N*=319)	
	1	13.37	8.46	
	2	67.09	64.58	
	3	19.54	26.96	
	Total	100.00	100.00	.22
Ruth		Cycle 1 (*N*=528)	Cycle 4 (*N*=447)	
	1	7.77	5.59	
	2	72.14	65.99	
	3	20.09	28.42	
	Total	100.00	100.00	.20

*** Expressed as percentages of total utterances per cycle for each teacher**

Across the four cycles of research, for both teachers there were small decreases in overall Level One and Two utterances, and increases in overall Level Three utterances. However, the most important change in the teachers' pedagogy proved to be in their questioning. A comparison of the proportions of open and closed questions out of total questions in Cycles One and Four found larger effect sizes for both teachers. While the effect size for Ruth remained in the small range (.29), for Anne the effect size was in the medium range (.49). Comparisons of proportions of questions are summarised in Table 8.7 (p. 171).

Table 8.7: Comparison of proportions of question types in Cycles One and Four*

	Question type	Percentage of utterances*		Effect size (Cohen's d)
Anne		Cycle 1 (*N*=95)	Cycle 4 (*N*=95)	
	Closed	74.74	51.58	
	Open	25.26	48.42	
	Total	100.00	100.00	.49
Ruth		Cycle 1 (*N*=112)	Cycle 4 (*N*=129)	
	Closed	69.64	55.81	
	Open	30.36	44.19	
	Total	100.00	100.00	.29

*** Expressed as percentages of total questions per cycle for each teacher**

Although the calculated effect sizes are comparatively small, they do establish that the professional development provided by the action research process resulted in changes in the teachers' pedagogy that have some practical significance. The implications of these findings will be discussed in more depth in Chapter Nine.

8.3 Teacher reflection

At the end of Cycle Four, Anne and Ruth were released from their classrooms for the final reflection day. As in previous cycles, the first half of the day was devoted to discussing the previously coded observation transcripts, and comparison and cross checking of our analyses. During the second half of the reflection day the teachers used their reflective journals along with their lesson transcripts to discuss and reflect on aspects of, and changes in, their pedagogy.

Some of the teachers' comments on changes in their teacher talk, questioning, and feedback have been set out in previous sections of this chapter. We also used the day to discuss the overall usefulness of the research process in the teachers' professional development. Our discussion covered the following topics; the usefulness of the readings, the usefulness of the Hierarchy of Classroom Interactions, learning outcomes, teacher knowledge and thinking, professional development and changes in teaching practice, and future professional development goals.

8.3.1 Readings

At the beginning of Cycle Four, I had asked Anne and Ruth to write reflective comments in relation to the readings that we worked with during the cycle. Asking the teachers to reflect in writing on the readings had the intended purpose of encouraging deeper reflection. The teachers' written responses to each reading showed depth of understanding, and in several instances they had been able to directly relate the material to their own practice. The teachers were clearly aware of the impact of the readings on their reflective skills.

> *Anne: It really makes me think about what I'm doing. I hope I can keep it up now that the observations have finished.* ***(Reflection Day: Cycle Four)***

> *Ruth: I hate to admit it, but I wouldn't normally have volunteered to read that sort of thing, but now I realise how helpful it can be. It gives you a new perspective.* ***(Reflection Day: Cycle Four)***

The teachers' written responses to the readings are summarized in Table 8.8 (p. 173).

Table 8.8: Summary of teachers' written reflections on Cycle Four readings

Reading	Anne	Ruth
Critical Theory and Classroom Talk (Young, 1992)	Made me think about kinds of questions I ask. Sometimes even "open questions" aren't what they seem – have a prescribed expected answer.	Most classroom questions are really "closed" – in that teacher expects or accepts a limited range of answers. All leading somewhere. Hadn't thought of it that way before.
Classroom interactions (McGee, 2001)	Liked McGee system – fitted hierarchy. Initial- follow-up-managerial-cognitive memory-convergent-evaluative thinking-divergent-grounding-extension-routine	Found info. on types of questions useful, Also section on encouraging thinking through questions-good to see other teachers have same problems-too much talk, guessing games, repeating students' answers, not clear, etc.
Scaffolding: A powerful tool in social constructivist classrooms (Roehler & Cantlon, 1997)	Importance of questioning and feedback. Learning conversations give students opportunities to develop and verbalise thoughts.	Questioning important. Clarifying thinking on the spot. Interactions are where learning occurs. Teacher–student, student-student, individuals, groups, whole class.
Are there any questions? (Croom, 2004)	Using questions at the right time-as lead or divergent questions. Important to keep all involved. Think-pair-share, really useful strategy to use.	Don't allow some children to dominate-others to opt out. More thought needed about types of questions and how to pose them.
What questions do you have? In defense of general questions: A response to Croom (Olson & Clough, 2004)	Puts accountability with student. Teacher needs to probe, extend thinking. *Level* of question important. Ch/n need to feel safe. Find out why they opt out. Teacher needs to listen carefully. Move from right answer to justification of ideas.	Links to Bloom-levels of questioning. Get them really thinking. Try to involve as many students as possible. Why do some ch/n not contribute? Need safe climate.

8.3.2 Usefulness of the Hierarchy of Classroom Interactions

During the Cycle Four reflection day, I asked the teachers to comment on the usefulness of the Hierarchy of Classroom Interactions. Firstly, I asked them to consider whether it had assisted them to analyse the transcripts of their lessons.

> *Anne: I found it really helpful to sort out the different kinds of interactions. Without it* [the hierarchy], *it would have just been a big muddle.* ***(Reflection Day: Cycle Four)***

> *Ruth: Initially I found it a bit confusing, too many categories. As I got used to it, it got easier to allocate lesson parts to it. It helped me to organise things.* ***(Reflection Day: Cycle Four)***

I also asked the teachers whether the hierarchy had helped them to think about their pedagogy.

> *Ruth: It was really useful in the reflection process, - helped me to really focus on what I was doing, and* ***not*** *doing!* ***(Reflection Day: Cycle Four)***

> *Anne: I found it really helpful because I could see patterns and it helped me to see areas where I needed development. I was really shocked in Cycle Two, with all that instructing. With the three levels of interaction it was easier to see what I was doing, and then for looking at the levels of questioning and feedback.* ***(Reflection Day: Cycle Four)***

It is clear from the above comments that the hierarchy had been a useful tool for the teachers in the analysis of their lesson transcripts. It had helped to make their interactions more explicit, and in turn assisted them to focus on the effectiveness of their learning conversations.

8.3.3 Learning outcomes

When asked whether the requirement to provide learning outcomes had changed the way they thought about their lessons the teachers had the following to say:

> *Anne: I've found it's really helped me to keep on track, to focus on where I want to go. It's made me really focus on what the* ***learning*** *is going to be, and how we're going to get there. Sometimes, before, I really used to put more thought into what I would* ***do****, and what I was going to get them to do, and not "why." I'm sure it does help the kids - knowing what we're aiming for.* ***(Reflection Day: Cycle Four)***

> *Ruth: Being in this study for nearly two years has helped me to focus on the* ***purpose*** *of my lessons. And now I automatically share the learning outcomes with the class. Before, as a general sort of rule I would begin a lesson and pretty much take the children along for the ride, with them not knowing what we were aiming at. I imagine there was a constant state of not knowing. Partly due to the fact that* ***I*** *possibly didn't know what my desired outcome was! I mean, I generally knew what to*

expect but didn't really have an "end" in my mind. ***(Reflection Day: Cycle Four)***

In Cycle Two, I had been concerned to discover that Anne and Ruth were accustomed to developing learning outcomes for major units of work but not for individual lessons. However, their practice was consistent with the findings of Alexandersson (1994). The teachers' comments indicate that the requirement to provide learning outcomes for individual lessons had forced them to become much more focused on learning in their planning, and much more conscious of making their teaching purposeful. It was encouraging that both teachers indicated that they now considered it a normal part of their practice to share learning outcomes with their students, and that they believed that when students know what they are "aiming for" there are beneficial effects on learning.

8.3.4 Teacher knowledge and thinking

During the reflection day I asked the teachers what types of knowledge they believed to be essential in a teacher's professional knowledge base.

Anne: I think that your own content knowledge is most important. Knowing what to tell them, and when. As well as what questions to ask. But to give coherent explanations, you have to have sound content knowledge of the subject so you can explain clearly in a way that they can understand - and so you can answer their questions. ***(Reflection Day: Cycle Four)***

Ruth: Yes, our content knowledge is ***very*** *important,* ***but*** *it's impossible for teachers to know everything about* ***everything****.* ***(Reflection Day: Cycle Four)***

Both teachers talked about the importance of their personal subject content knowledge in their teaching. During the research process Ruth had demonstrated an accurate awareness of the gaps in her own content knowledge, and freely acknowledged the issues that this created. She expressed a valid concern when she referred to the requirement for teachers to cover all subjects in the primary curriculum. Ruth has quite accurately comprehended that it is impractical to expect all primary school

teachers to have sufficiently deep content knowledge to provide exemplary practice across all subject areas.

The teachers also talked about other important areas of knowledge.

> *Anne: Knowledge of … children's developmental and learning needs, problem based learning processes, Bloom's Taxonomy.* ***(Reflection Day: Cycle Four)***

> *Ruth: How children learn, hooking children into thinking, knowing about "Inquiry Learning."* ***(Reflection Day: Cycle Four)***

It was interesting that both Anne and Ruth referred to the need to know about how children learn, when this was an area in which neither had any formal knowledge. This indicated that there was an unrecognised gap between the teachers' beliefs and their practice (Kemmis & McTaggart, 2000; McGee & Penlington, 2001). The teachers were vague about whether their teacher education had covered formal learning theory, and neither had a clear or accurate memory of any theories of learning. Both had hazy, piecemeal knowledge that they had accumulated informally. This is consistent with claims that teachers are at best ambivalent about the importance of formal theory (Dufficy, 2005), and that they apply it with incomplete understanding (Bransford, Brown & Cocking, 1999).

8.3.5 Professional development and changes in teaching practice

During the reflection day we discussed the contribution of the action research process to the teachers' professional development. When asked to describe their natural teaching styles Anne and Ruth were able to do so very accurately.

> *Anne: Conversational, I do a lot of questioning, listening, and redirecting. I think I'm pretty positive. I like to be encouraging, supportive.* ***(Reflection Day: Cycle Four)***

> *Ruth: Humour and laughing at oneself plays a big part. I'm humorous, sarcastic sometimes. I tend to talk too much and I don't ask the right questions. I tell children too much. Not enough learning going on.* ***(Reflection Day: Cycle Four)***

When asked whether they thought the research had changed their teaching practice their comments were as follows.

> *Ruth: I know I'm asking better questions. I think the work we did on Bloom's Taxonomy really helped me with that. And I'm making my outcomes more specific because I'm sharing them with the children. I'm not talking as much - probably more aware of "time-wasters."* ***(Reflection Day: Cycle Four)***
>
> *Anne: It's made me more conscious of the need for my own depth of understanding, knowledge of content, and to be clearer when I'm giving instructions so I don't have to keep repeating them. I'm trying to ask better questions, to talk less and give them more time for practicing skills, sharing the learning outcomes with the kids is a big change! Keeps me honest!* [laughs] *I guess it's made me more focused.* ***(Reflection Day: Cycle Four)***

The teachers' comments are in keeping with the observed changes in their pedagogy, and an indication that they had developed the ability to reflect more accurately on their practice.

Anne and Ruth made the following comments when I asked them what they considered to be the most helpful professional development aspects of the action research process.

> *Anne: Being able to see a record of what I was doing, and not doing, in the transcripts made it so clear, and you don't normally have that opportunity. The hierarchy spelled it out, and helped with the analysis. Having time, you know, over nearly two years, to really think about aspects of what I was doing. The readings, working together, the discussion, especially on the reflection days, where sometimes things fell into place when we talked about them.* ***(Reflection Day: Cycle Four)***
>
> *Ruth: Yes definitely the discussions that we had. Working with each other. Seeing someone else's teaching in the transcripts. I* ***really*** *appreciated the transcripts. It made it so clear. It's something teachers wouldn't normally have time to do, type it all out. I think you pick up different things when you see it all spelled out like that on paper. It certainly made me aware of a lot of my faults. I enjoyed the readings too. I hate to admit it, but I wouldn't normally have volunteered to read that sort of thing, but now I realise how helpful it can be. It gives you a*

> *new perspective. I think spreading it out over a couple of years really made it worthwhile, I know I learned things about my own teaching that I won't forget - not like when you go to a one day course or something - in a few weeks its all forgotten.* ***(Reflection Day: Cycle Four)***

Both teachers valued the extended duration of the professional development opportunities afforded by the action research process. They particularly emphasised the usefulness of having written transcripts of their lessons, which they could use to analyse and reflect on their own practice. They also appreciated the opportunity the research provided for them to work together, discussing their practice in the light of the professional readings. All of these are aspects of the professional development opportunities that are provided by classroom-based action research conducted in a community of practice (Craft, 2000; Day, 1999; Poskitt, 2005).

8.3.6 Future professional development goals.

Both Anne and Ruth spontaneously spoke about personal future goals for professional development that had arisen out of the research process. Anne's unprompted suggestion that she might record herself in the future to monitor her practice is an indication of her awareness of the knowledge and skills she had learned in the action research process.

> *Anne: It's made me aware of areas to develop, in particular, talk less, guide more, give them more opportunities to practise, have a go, before I jump in. Do more sharing of ideas. Try to find time to do more professional reading. That* ***really*** *makes me think about what I'm doing. I hope I can keep it up now that the observations have finished. I might tape-record myself sometimes, just to see what I'm doing.* ***(Reflection Day: Cycle Four)***

Ruth's decision to monitor her use of questions and to make the sharing of learning outcomes a future appraisal goal is an indication of what had been achieved during the action research process.

Ruth: Mm, the readings have given me real insight into what children learn. Not to take it for granted that they're all learning something. I want to keep on with changing my questioning to encourage thinking more, that's become a goal. Also "What is the purpose of this activity?" Telling children what they are going to learn is an appraisal target as a result. That's something I didn't use to do. Thinking more about how the lesson will unfold and so on. ***(Reflection Day: Cycle Four)***

It was encouraging that both teachers talked about the value of professional reading, something that Ruth in particular, had not considered before participating in this study. Both teachers had come out of the research process with changes in their thinking and practice, and with personal goals clearly linked to what they had learned.

8.4 Researcher reflection

The end of Cycle Four saw the conclusion of the action research. During the two year period there had been considerable development in Anne and Ruth's ability to analyse, critique, and reflect on their teaching practice. In Cycle One both teachers had been somewhat passive participants in the research process. They had approached the analysis of the transcripts of their teaching in a very superficial way, and focused on the effects of the actions of other people, including their students, on the type and quality of their learning conversations, rather than on their own behaviour.

In Cycle Two, Anne and Ruth were beginning to focus on the teaching and learning in their transcripts, but they were still not making direct links between their own practice and the readings provided. They had demonstrated some insight into the dynamics of their teaching, although they had not yet reached the stage where they were able to critique their practice independently. The teachers were developing the ability to reflect on their practice after it had occurred, but they were not engaging in reflection during their teaching. Despite an increased effort to improve pedagogy, in Cycle Two there was actually a deterioration in the quality of both teachers' learning conversations.

In Cycle Three, Anne and Ruth were analysing and reflecting on their practice much more effectively. They were beginning to critique their practice independently, and had become more objective about their own pedagogy. The teachers were critically examining the teaching and learning in their own and each other's transcripts, and linking what they found to the readings. They were also developing the ability to consciously monitor their behaviour during their teaching.

As the research progressed we gradually established an effective community of practice, in which the teachers worked together, examining and discussing each other's transcripts, and providing each other with constructive criticism regarding both positive and negative aspects of their practice. By the end of Cycle Four the teachers were able to focus more closely on their interactions with students. They were able to see more clearly the relationship between their interactions at Level Three of the hierarchy and deep learning opportunities for students, and there had been an improvement in the quality of their learning conversations.

Over the four cycles of research both teachers gradually assumed greater ownership of, and involvement in, the research process. Ideally there would have been a fifth action research cycle managed by the teachers, in which they would have observed and critiqued each other with little involvement from me, but this was not possible. Anne left the school at the end of the term to take up the position of a Deputy Principal in a new school some distance away, where she would not have a class until the middle of the next school year.

8.5 Conclusion

Throughout the four action research cycles the findings related to both the first and second-order questions centred on recurring themes, including teacher knowledge and thinking (including pedagogical content knowledge and understanding of learning theory), learning outcomes, questioning and feedback, and particularly during the first two cycles, discrepancies between what the teachers thought they were doing and

what they were actually doing. The implications of these findings are discussed in the following chapter.

During the four cycles of research, the reading, discussion, and analysis of lesson transcripts using the Hierarchy of Classroom Interactions had enabled both teachers to see their teaching more objectively, and had contributed appreciably to their professional development. Throughout the two-year period there was considerable development in the teachers' reflective capacity, in their ability to analyse and critique their own and each other's practice, and in the quality of their learning conversations. The professional development opportunities afforded by the establishment of an effective community of practice during the action research process are discussed in greater depth in Chapter Nine.

CHAPTER NINE

CONCLUSIONS AND IMPLICATIONS

> ***Teachers need to develop models of their own professional development that are based on lifelong learning, rather than on an "updating" model of learning, in order to have frameworks to guide their career planning (Bransford, Brown, & Cocking, 2000, p.242).***

This action research study investigated the effects of teacher knowledge and thinking on the quality of teacher-student interactions in classroom learning conversations. It also provided the participating teachers with an extended period of reflective professional development in the form of classroom-based action research. Because it was based in New Zealand primary school classrooms and involved "regular" classroom teachers, the study has provided valuable, in-depth information about everyday classroom practice. The study is an investigation into what Timperley, Wilson, Barrar, and Fung (2006) have termed the "second black box" (p. 13) between teaching inputs and student learning, which comprises "teachers' interpretation and utilisation of available understanding and skills" (p.13). The study answers questions concerning the links between primary school teachers' knowledge, thinking, and practice that have not previously been investigated in a New Zealand context.

This chapter discusses the significance of the findings of the action research project, and argues the merits of the process as a model for classroom-based reflective professional development. The first section of the chapter discusses the ways in which the participating teachers' knowledge and thinking at the beginning of the study influenced the quality of their learning conversations with students. In section two the action research process is examined, including the mechanisms that were provided to facilitate reflection and the critique of practice. Factors associated with the process of change are also discussed. The third section of the chapter discusses the changes that occurred in the teachers' knowledge, thinking, and practice as a result of reflective professional development. Section four then briefly examines changes in the teachers' learning conversations across the four cycles of action research. The fifth section of

the chapter considers the implications of the findings of this study for teacher education and development, in relation to both pre-service teacher education and in-service professional development. In the final section the limitations of the present study are discussed, along with implications for future research.

9.1 How did the teachers' knowledge and thinking initially influence the quality of their learning conversations with students?

One of the purposes of the present study was to examine the effects of the participating teachers' knowledge and thinking on the quality of their interactions with students during classroom learning conversations. The interviews, discussions, and classroom observations provided rich data about the teachers' pedagogical content knowledge, the ways in which they thought about teaching and learning, the nature of learning conversations between the teachers and their students, and the changes that occurred as the study progressed. Initially, both teachers appeared to be unable to reflect upon their practice beyond a superficial level. Unexpectedly, routinised behaviours and implicit beliefs were found to exert a more powerful influence over the teachers' classroom practice than their pedagogical content knowledge and espoused theories of teaching and learning.

9.1.1 Pedagogical content knowledge and beliefs about learning

Subject content knowledge

Experts agree that teachers need to have sufficient knowledge and understanding of subject material in order to make it accessible to students (Shulman & Shulman, 2004; Turner-Bisset, 1999). Although the findings of several overseas studies have revealed gaps in teachers' content knowledge that seriously affected the quality of their classroom interactions (e.g., Gregg, 2001; Prestage & Perks, 2000; Sanders & Morris, 2000; Soares & Prestage, 2000; Torrance & Pryor, 1998), lack of subject content knowledge did not prove to be a major factor in the present study. There were occasions when the teachers' subject content knowledge was found to be wanting, but it was not a frequent occurrence. This may have been because both of the

participating teachers were mature adults with rich life experience and broad general knowledge, providing them with subject content knowledge that was, for the most part, sufficiently developed for the purposes of their learning conversations with students.

Ruth's vocabulary and general knowledge were less comprehensive than Anne's, partly perhaps because, by her own admission, she did not read as widely. As a consequence her subject content knowledge was more inclined to let her down. On such occasions she readily acknowledged the problem and involved her students in her investigations to seek out the required information. Given the general educational background of most New Zealand primary school teachers, and the fact that they are required to teach in all subject areas, it may be unrealistic to expect that they should all have the depth of content knowledge required for exemplary practice across the entire curriculum. Ruth's approach, entirely consistent with co-constructive learning theory, is a pragmatic if not ideal way of dealing with this issue. Although teachers generally need to have sufficient knowledge to effectively engage in content with students (Jordan, 2004), within a co-constructive approach there is less necessity for teachers to have the detailed content knowledge required to "know all the answers" across every curriculum area. However it *is* essential that teachers be sufficiently well educated and have the requisite research skills to be able to work with students to seek the answers that they are unable to provide.

Learning theory

The findings of the present study support James' (2006) contention that teachers' understandings of learning often lack theoretical coherence. The interviews revealed that the teachers had very little knowledge or understanding of formal learning theory, apart from vague recollections from their pre-service teacher education of Piaget's stages of development. However, they were both able to articulate personal beliefs about learning that they had developed informally through in-service courses, discussion at staff meetings, and conversations with colleagues. These beliefs were consistent with aspects of constructivist theory. Ruth talked about building on prior knowledge, and providing child-directed experiences in an appropriate environment, ideas that emanate from personal constructivism. Anne talked about using discussion and the sharing of ideas, an approach consistent with social constructivism.

Both of the teachers had in fact only a superficial and piecemeal understanding of *aspects* of constructivist theories, and they had developed some misunderstandings about their core principles. While both teachers frequently used the term "scaffolding," they were unable to elaborate upon its meaning beyond "supporting" or "helping" students' learning. In addition, both Anne and Ruth had confused constructivist theories of learning with a theory of pedagogy involving a discovery oriented, experiential approach, resulting in an aversion to direct instruction. This misunderstanding is consistent with the findings of several authors (e.g., Airasian & Walsh, 1997; Bransford, Brown, & Cocking, 1999; Bransford, Derry, Berliner, & Hammerness, 2005; Bullough, 2001; Hammerness, Darling-Hammond, & Bransford, 2005; Sfard, 1998). The teachers' misguided belief that it is wrong to directly teach students information frequently resulted in lessons that involved long, convoluted, laborious, and often tedious questioning to draw out requisite basic information from students, at the expense of extending their knowledge and thinking or developing deep understanding.

Formative assessment

Black and Wiliam (2006a) argue that formative assessment is an important part of teachers' work, and that attention to improving its practice results in the enhancement of student achievement. At the beginning of the present study the teachers' lack of formal knowledge of formative assessment played an important part in the quality of the questioning and feedback that they provided in their learning conversations with students. Their understanding of formative assessment had developed informally and eclectically, either from the "reporting back" of colleagues or from their own experiences of practically based in-service professional development. When interviewed, both teachers described personal beliefs about formative assessment that involved interaction with students to provide an on the spot, immediate response to address learning needs, through adaptation of teaching approaches or activities. However, in Cycle One the teachers were not giving a great deal of consideration to the ways in which they might use formative assessment in the development of students' understanding, and their interactions involved predominantly low-level questioning and feedback.

Black, Harrison, Lee, Marshall, and Wiliam (2002, 2003) have investigated the relationship between the quality of teachers' interactive questioning and feedback and their ability to develop students' thinking and understanding. Consistent with their findings, at the beginning of the present study learning conversations were for the most part rather superficial, their quality compromised because the teachers were mainly asking closed questions that required instant recall. They were not asking many open questions to encourage deeper thinking, nor were they allowing adequate time for students to consider their answers.

There have been many claims that the quality of feedback provided to learners is of fundamental importance in developing students' understanding (e.g., Black, Harrison, Lee, Marshall, & Wiliam, 2002, 2003; Black & Wiliam 2006a; Sadler 1989, 1998; Tunstall & Gipps, 1996). In their interview responses concerning feedback, the teachers talked about "telling students what they're doing well," providing "immediate guidance if they're on the wrong track," and telling students "what they need to do to move forward." However, at the beginning of the present study most of the feedback that the teachers were providing to students involved low-level repetition, confirmation, or praise of student responses to questions. "Dead-end" feedback such as this has more to do with managing the flow of the lesson than with contributing to or developing students' knowledge and understanding. While praise may have value when given alongside more constructive forms of feedback, it is not considered to be a form of true feedback in itself (Hattie, 2001; Hill & Hawk, 2000; Sadler, 1989), and it is considered by some (e.g., Clarke, 2003; Shepard, Hammerness, Darling-Hammond, & Rust, 2005; Wiliam, 1999) to be detrimental to effective learning.

Sadler's (1989) seminal work on formative assessment emphasised the role of the learner in *using* feedback to close the gap between current and desired performance. This is only possible when the teacher has developed learning goals and performance criteria and shared them with students in advance. Students may then use constructive feedback to make decisions in order to go about achieving the desired goal (Sadler, 1989; Shepard, Hammerness, Darling-Hammond, & Rust, 2005; Tunstall & Gipps, 1996). However, as with the findings of previous studies (e.g., Alexander, 1995; Alexandersson, 1994; Leinhardt & Greeno, 1986), at the beginning of the present

study although both teachers were conscientious about planning the overall structure of future teaching in the form of long-term units of work, they were not in the habit of formally planning individual lessons. When teaching they relied more on on the spot planning, and routines of practice that were focused on activities rather than learning outcomes. They did not therefore develop specific learning outcomes for each lesson, let alone share them with their students. As a result the observed lessons were often less focused on learning than on activities, the purposes of which were not always clear to the students.

9.1.2 Espoused theories versus theories-in-use

In 1974 Argyris and Schon first argued a distinction between the espoused theories that professionals use to explain their actions to themselves and to external audiences, and the implicit theories-in-use on which their actions are based. It became apparent very early in the present study that there was a discrepancy between what the teachers *believed* or claimed they were doing and what they were *actually* doing, particularly in relation to learning and assessment theory. According to Eraut (2000, pp. 123) “the mismatch between espoused theories and theories-in-use is a natural consequence of the dualistic approach to professional education” because while espoused theories are developed, taught, and assessed in formal educational contexts, theories-in-use develop separately as teachers learn to cope with the pressures and demands of practice. The implications of this for pre-service teacher education are discussed later in this chapter.

Although in the present study both of the participating teachers had recently “upskilled” their teaching qualification from an undergraduate diploma to a bachelor’s degree, neither had completed papers in learning theory (because they were not offered in their special one year programme) or assessment (because it was an optional paper). Consequently neither teacher had any real comprehension of current learning or assessment theory. Both teachers were using current jargon with little understanding of its meaning, and although they talked about building on prior knowledge, developing understanding, scaffolding student learning, and providing feedback to help students move forward, their practice was often inconsistent with their stated beliefs. Their lessons often involved repetitive instructions, they wasted

valuable teaching time drawing basic information from their more knowledgeable students, and their questioning and feedback was predominantly low-level.

Although the participating teachers' espoused beliefs about learning were consistent with aspects of contemporary constructivist theories, their practice at the beginning of the present study often mirrored the styles of teaching that they were likely to have experienced as students thirty to forty years ago. Teachers develop their implicit understandings of the teaching and learning process informally. Some of this knowledge comes from their own developing practice, and some from their personal experience as students (Eraut, 1994, 2000; Hammerness, Darling-Hammond & Bransford, 2005; Turner-Bisset, 1999; Yero, 2002). Indeed, previous studies have concluded that as a result of their many years of experience of schooling as students, teachers enter the profession with preconceived implicit notions of what teaching involves. Despite the fact that teachers may argue explicitly, or have personally experienced, that particular ideas and methods do not promote learning, those very ideas and methods often strongly influence their practice (Eraut, 2000; Yero, 2002).

Teachers tend to assimilate new information and experiences into their thinking without developing deep understanding, and consequently their preexisting ideas and practices have been found to be very difficult to shift (Hammerness, Darling-Hammond, & Bransford, 2005; Yero, 2002). Because it is difficult for teachers to acquire self-knowledge the implicit theories that underpin their behaviour often remain unexamined (Bransford, Derry, Berliner, & Hammerness, 2005; Eraut, 1994). The present study provided the participating teachers with opportunities to critique and reflect upon their own classroom practice, and in the process highlighted for them the gaps between their espoused theories and their theories-in-use.

9.1.3 Routinised behaviour versus reflection-in-action

The teachers' behaviour, particularly during the first two cycles of the present action research process, was consistent with the claims of Yero (2002), that teachers frequently act without reflection or introspection, and that much of their behaviour stems from "mindless" habit (p. 11) rather than higher-level thinking. Both Anne and Ruth had been teaching for over twenty years. They were well respected by their

colleagues and were widely considered to be capable, competent professionals. A number of experts (e.g., Alexander, 1995; Dreyfus & Dreyfus, 1986; Eraut, 1994, 2000; McGee & Penlington, 2001) claim that as teachers and other professionals gain experience and competence they rely less on explicit rules and guidelines and more on implicit understandings and intuitive decision-making. As professionals progress from novices through varying levels of proficiency to become experts in their field, their practice becomes less deliberate and more automatic and routinised. Paradoxically, the more experienced and competent teachers become, the more they utilise habitual, routinised, and unreflective practices to maintain order in the complexity of classroom life and to manage the flow of their lessons.

According to Somekh (2006) human behaviour is often strongly routinised in demanding situations. For effective functioning a large proportion of behaviour may be off-loaded to automatic actions, responses, and utterances, many of which may be unconscious and "counter-productive to … espoused intentions" (p.15). Routinised behaviours provide teachers with the background efficiency that is essential for coping with the complexity of classroom life without becoming overwhelmed. These behaviours develop naturally over time. They enable teachers to perform a variety of activities without having to stop and think about how to do them. However, because they are based on implicit knowledge and intuitive decision-making, routinised behaviours are difficult to monitor and they sometimes become dysfunctional (Eraut, 1994, 2000; Hammerness, Darling-Hammond, & Bransford, 2005). The present study has clearly established that the routinisation of teachers' practice has a powerful and often detrimental influence on the quality of their interactions with students. This is a factor that has not been given a great deal of consideration in previous research into teachers' thinking and practice in a New Zealand context.

In 1974 Argyris and Schon suggested that making implicit theories-in-use explicit and thereby open to criticism was the key to professional learning. Many teacher beliefs and behaviours are based on implicit and unexamined assumptions that need to be made explicit in order to be critiqued. By making implicit theories explicit, reflection allows professionals to identify the routinised and unthinking aspects of their practice that are inadequate, unproductive, and dysfunctional (Bransford, Derry, Berliner, & Hammerness, 2005; Schon, 1983).

At the beginning of the present study a great deal of the teachers' behaviour during the interactive phase of teaching was routinised. They were unable to reflect upon their teaching beyond a superficial, technical level (van Manen, 1977), and consistent with findings of other studies (e.g., Elliott, 1991; Eraut, 1994; Turner-Bisset, 2001) their self-comment was justificatory rather than critical, in that they attributed the shortcomings that they were able to recognise to external factors beyond their control. According to Yero (2002):

> Unless teachers become aware of how their internal worlds influence and constrain their perception and behaviour, they will continue to act mindlessly. They will remain secure in the belief that they are acting in the "right" way because they have never considered an alternative (p.12).

It was not until the end of Cycle Two that Anne and Ruth were able to reflect on their actions sufficiently to at least recognise routinised behaviour, when Ruth made the comment, "I just go into autopilot a lot of the time when I'm teaching", and Anne referred to "doing these things without even thinking about it." However, even at this point neither teacher was able to engage in the reflection-in-action required to monitor and adjust their behaviour as it was occurring.

Eraut (1994, p. 144) contends that engaging in the reflective process "pulls the practitioner out of the 'automatic pilot' mode of skilful behaviour." Unfortunately, the isolation of teachers in their individual classrooms is not conducive to reflection-in-action. Teachers are frequently unable to distance themselves sufficiently from their own practice to question their behaviour, and consequently their reflective practice remains at a technical, problem-solving level (van Manen, 1977). Teachers need to be able to communicate with their colleagues in order to test their thinking and practice against the views of others. They may need support and guidance from colleagues or outside facilitators if they are to make essential changes to their practice. Confrontation by the self, or others, involving a sensitive balance between challenge and support, is required to move teachers from technical rationality to critical examination of their classroom practice (Convery, 1998; Schon, 1983). Such a process was an integral component of the present study, and is discussed in more detail in the following section of this chapter.

9.2 An action research model of reflective professional development

The second purpose of the present study was to provide the participating teachers with the opportunity to engage in a long-term process of reflective professional development, in the form of classroom-based action research. While action research involves the investigation of substantive issues it is also a form of intervention, a means of bringing about change in social practices (Somekh, 2006). According to Somekh, action research "enables the transformation of the unthinking routines of practice" into actions that are "grounded in depth of understanding" and consistent with the "best professional practice" (p. 29). The present action research process afforded the two participating teachers the opportunity to work with an outside facilitator in a small school-based community of practice. The group worked together for nearly two years through four cycles of action research, reading and discussing relevant professional development material and developing the Hierarchy of Classroom Interactions, which was subsequently used to assist with the analysis and discussion of the transcripts of observed lessons.

9.2.1 Development of a school-based community of practice

Eraut (2000) claims that routinised behaviour and implicit thinking are more easily made explicit when practitioners are encouraged to talk with their colleagues about their work. When provided with the opportunity to work together in a community of practice, teachers are encouraged to challenge themselves and each other to identify their routinised behaviours and the discrepancies between their espoused theories and their practice. Colleagues working together bring different perspectives that help to make visible what may have previously been taken for granted about teaching and learning. Working in such groups allows teachers to explore, develop, and refine their teaching together. The collegial nature of this process and the feedback provided within it stimulate reflection and the development of new skills (Cochran-Smith & Lytle, 1999; Hargreaves & Fullan, 2000; Joyce & Showers, 2002; Nias, 2005; Zorfass & Keefe Rivero, 2005).

At the beginning of the present action research project a small research group was established in which I worked as an outside facilitator with the two classroom teachers. Our group worked together over a period of nearly two years, meeting regularly (at least once a week during the observation phase of each cycle) to discuss both the research process and what we were learning from it. As the project progressed through the four cycles of action research our group established close bonds, and an effective community of practice gradually emerged. As previous studies have found (e.g., Borko, 2004; Convery, 1998; Evans, Lomax, & Morgan, 2000; Salzman, Snodgrass, & Mastrobuono, 2002; Zorfass & Keefe Rivero, 2005), the opportunities for meaningful discussion with colleagues, particularly during the reflection days at the end of each cycle, had a powerful impact on the teacher's reflective capacity.

In the first cycle the teachers were quite self-conscious about the observation process and about sharing what was in their lesson transcripts, but over time they became much more trusting and relaxed. By the fourth cycle, after nearly two of years of working together, the teachers were quite at ease with reading each other's transcripts and critiquing each other's practice. They were able to more readily acknowledge the weaknesses that were revealed in their practice and to accept constructive criticism. At the same time they found it affirming when another member of the group commented on their strengths.

The opportunity to think collaboratively expanded and deepened the teachers' understanding of their own practice. With the support of interested and caring critical friends to help them through the process of self-evaluation the teachers became much more open to further learning and professional development. They gradually became more involved and proactive in the research process. Over time they made slow but steady progress in developing their reflective skills, and eventually in making some improvements in the quality of their interactions with students.

9.2.2 Involvement of an outside facilitator

Outside facilitators involved in action research projects play a key role in establishing goals, planning the research process, collecting data, and developing tools to assist

with data analysis (Mitchell & Cubey, 2003). As the outside facilitator in the present action research project I initiated the project and developed the original research questions. I also assumed a number of organisational and practical roles. I was responsible for the collection of the research data, which included conducting teacher interviews, writing observational fieldnotes, and transcribing the observed lessons. I also took responsibility for planning, funding, organising, and facilitating the off-site reflection days. Although both of the teachers were enthusiastic about participating in the study, they did not have the background knowledge, resources, and in particular, the time, to assume these responsibilities.

As has been the case in previous studies (e.g., Carr, May, Podmore, Cubey, Hatherley, & Macartney, 2000; Jordan, 1999; Mitchell & Cubey, 2003) although I retained overall responsibility for managing the project throughout the four research cycles, my role as the outside facilitator changed as the project progressed. Intensive input was necessary at the start, when the participating teachers needed reassurance about the research process and a great deal of support to develop their reflective skills. However, as their skills developed the teachers became more confident and less dependent on me.

Eraut (2000) argues that professionals are more likely to be able to talk explicitly about their knowledge and practice in the presence of a mentoring relationship. In the present study, in addition to managing the more practical aspects of the research project, I also acted as both mentor and critical friend to the participating teachers. By providing readings, facilitating discussion, and initiating the development of the Hierarchy of Classroom Interactions, I assisted the teachers to develop the background knowledge and vocabulary that they needed to discuss and to effectively critique their practice.

The involvement of an outside facilitator is considered to be crucial in assisting teachers to revise their thinking and to overcome their tendency to justify findings about their practice (Timperley & Robinson, 2001). Along with specialist knowledge and skills, an outside facilitator brings a different and more objective perspective to the process (Carr, May, Podmore, Cubey, Hatherley, & Macartney, 2000; Poskitt, 2005). Consistent with claims made by Mitchell and Cubey (2003), the analysis of

data in the present study was facilitated by my involvement. While acting as a critical friend I was instrumental in the development of the teachers' reflective skills. By asking challenging questions, providing constructive criticism and feedback, and offering an alternative viewpoint, I was able to provide the objectivity required to assist the teachers to critique their own practice more effectively. This enabled them to effect changes and improvements in the quality of their learning conversations with students.

9.2.3 Reading and discussion

One of my key roles as the outside facilitator in the research group was to assist the teachers to develop the background knowledge that was required to bring about changes in their thinking and practice. Because teachers often lack the theoretical foundations and tools for reflection that would allow them to change course when they learn that what they are doing is not working well, the provision of theoretical knowledge and knowledge of alternative practices has been promoted as a characteristic of effective professional development (Hammerness, Darling-Hammond, & Bransford, 2005; Mitchell & Cubey, 2003; Timperley & Robinson, 2001).

Eraut (2000) recommends the provision of professional reading to convey the theories, concepts, and vocabulary required to discuss and make sense of aspects of experience. However, because neither of the participating teachers was accustomed to engaging in professional reading outside of the requirements of formal academic study, it was important not to overwhelm them with material that they might consider to be a "turnoff." It was necessary, and sometimes a challenge, to find a balance between reading material that the teachers would find accessible, and that which would be sufficiently authoritative to provide the appropriate knowledge.

As the project progressed and gaps in the teachers' knowledge became apparent I provided readings and facilitated discussion that I considered to be pertinent to their professional development needs. The readings covered a variety of topics, including discourse analysis (Mercer, 1995), roles of academic researchers and teachers in action research (Mercer, 1995), effective learning conversations (McGee, 2001;

Pressley & McCormick, 1995) questioning (Black, Harrison, Lee, Marshall, & Wiliam, 2002; Croom, 2004; Olson & Clough, 2004; Young, 1992), "wait time" (Black, Harrison, Lee, Marshall, & Wiliam, 2002), feedback (Clarke, 2003; Knight, 2003), Bloom's Taxonomy of Educational Objectives (Bloom, 1956), and scaffolding (Roehler & Cantlon, 1997). More detailed information concerning the content of each of the readings is provided in the previous four chapters.

During discussion of the readings both Anne and Ruth were able to link the material with their own classroom practice. During the reflection day at the end of Cycle Four, the teachers commented on the usefulness of both the process and the content of the readings, in reflecting on their own practice. Engaging in professional reading and discussion provided the teachers with theoretical foundations and tools for reflection that they had previously lacked. It provided them with the concepts and vocabulary required to discuss and critique their lesson transcripts. It also challenged their thinking by introducing them to alternative practices. By the end of the study there had been a shift in the nature of teacher-teacher talk, from the shallow and mundane to a more thoughtful, analytical, and professional focus.

9.2.4 Analysing transcribed lessons

According to Mitchell and Cubey (2003) the involvement of participants in the collection and analysis of data from their own settings, in the form of recordings and observations, is a key process in effective professional development. It contributes to the revision of assumptions and understandings by "creating surprise through exposure to discrepant data" (p. xi) concerning the participants' own practice. Exposure to such discrepant or "incongruent" data is one way of "creating dissonance with a teacher's current position" (Timperley, Wilson, Barrar, & Fung (2006, p. 14). Timperley et al. claim that the creation of dissonance is one of three essential components of teachers' professional learning, along with cueing and retrieving prior knowledge, and becoming aware of new information. Accordingly, when confronted with the evidence provided by the transcripts of their lessons, the teachers in the present study were disturbed to discover that their practice was not always consistent with what they had believed it to be, and they immediately resolved to make improvements in their practice.

During the first cycle the teachers were unfamiliar with discourse analysis, and consequently were preoccupied with surface features of their own dialogue. Shocked at what they perceived to be incomplete sentences and incorrect grammar, a normal part of natural conversation, they were unable to analyse and critique the substance of their interactions with students. They were also unable to distance themselves sufficiently from their own practice to see it in more than a superficial way. However as the project progressed the teachers became more skilled at analysing the transcripts and were able to critique their practice much more effectively. They eventually reached the stage where they were able to independently examine the teaching and learning that was occurring in the transcripts, and make direct links between their own practice and what they had found in the readings.

9.2.5 Developing the Hierarchy of Classroom Interactions

During Cycle One it quickly became apparent that the teachers would need a "framework" to guide them in analysing their observation transcripts and in critiquing their interactions with students. With reference to relevant literature (e.g., Black, Harrison, Lee, Marshall, & Wiliam, 2002; Bloom, 1956; Mercer, 1995; Tunstall & Gipps, 1996; Wiliam, 1999; Wilson, Shulman, & Richert, 1987; Young, 1992), and in consultation with the teachers, I developed the Hierarchy of Classroom Interactions, which was explained in detail in Chapter Five (Section 5.2.2). The hierarchy assisted the teachers in analysing, coding, and critiquing their lesson transcripts.

Eraut (2000) claims that the provision of a "mediating object" (p. 120) to focus discussion may assist practitioners to talk more explicitly about their work. In the present study the Hierarchy of Classroom Interactions provided a schema (or mediating object) that focused the teachers' attention on their utterances in the transcripts, and provided the vocabulary for them to label, classify, and code their interactions with students in their learning conversations. By the end of Cycle Four the hierarchy had assisted the teachers to become much more focused in their analysis of the observation transcripts, and they were able to more effectively critique their own and each other's practice. It also provided a target of higher quality questioning and feedback for the teachers to aim for in their interactions with students. Indeed, by

the end of Cycle Four both teachers had made appreciable progress towards achieving this target.

9.2.6 Factors affecting the processes of reflection and change

The findings of the present study support the claim of a number of authors (Day, 1999; Eraut, 1994; Fullan, 2005a; Perkins, 2003) that the process of change is complex, unpredictable, and not always smooth running. Effective professional development is dependent upon a number of factors, not least of which is the participants' capacity to change (Day, 1999). In the present study, although there were eventually some changes in the teachers' practice, progress was not always straightforward.

There were two unanticipated factors that initially affected the professional development process in the present study. The first of these factors, which has been discussed in previous sections of this chapter, was the teachers' initial inability to effectively critique and reflect upon their classroom practice. At the end of the first cycle the teachers were unable to reflect upon their actions in more than a superficial manner during post teaching discussion, and they appeared unable to reflect at all while in the process of teaching. As previously discussed, this problem was dealt with gradually, through reading and discussion, and through analysis of the teachers' personal lesson transcripts using the Hierarchy of Classroom Interactions.

The second unanticipated factor in the professional development process was that although by the end of Cycle Two both teachers were able to at least recognise the routinised nature of many of their interactions with students, they had been unable to effect positive changes. Perkins (2003, p. 247), and Fullan (2005a, p. 47), have found that in complex situations when individuals are subject to stress, there is a tendency for behaviour to "regress" to simpler earlier-learned behaviours. Indeed, in the present study, despite their having made a conscious effort to improve the quality of their learning conversations with students, both teachers' practice in fact deteriorated, or regressed, in Cycle Two. The percentage of interactions with students related to behaviour management increased in both classrooms. Both teachers also asked proportionately more closed questions. In addition the percentage of repetitive low-

level instructions given by Anne increased, and in Ruth's case, there was an increase in the percentage of low-level telling.

Eraut (1994) provides a probable explanation for the regression in the teachers' practice. Eraut contends that the process of changing routinised actions is particularly difficult because a great deal of "unlearning" (p. 112) must take place before new routines can be established. New knowledge must be integrated into one's teaching style, a process that involves the modification of "the most fundamental and the most intuitive aspects of practice" (p. 53). According to Eraut, "changing one's teaching style involves deskilling, risk, information overload, and mental strain, as more and more gets treated as problematic and less and less is taken for granted" (p. 36). Eraut claims that the experience resembles becoming a novice again, bringing back difficulties with coping and with maintaining classroom order:

> Even the intuitive decision making is disrupted because one's "navigation lights," those semi-conscious cues which alert teachers to the need to change pace or the activity or attend to certain pupils, are extinguished when the pattern of practice is modified (Eraut, 1994, p. 112).

Hammerness, Darling-Hammond, and Bransford (2005) also acknowledge the difficulties that teachers face as they attempt to "unlearn" (p. 363) routinised behaviour, and suggest that they may "initially become less efficient than previously, as they let go of techniques that have been comfortable and well-practiced" (p. 363). The authors emphasise the importance of supporting teachers in the process of "letting go" (p. 363) of previously learned routines, and of assisting them to perceive the need for change not as failure, but as a positive and inevitable aspect of life-long learning and part of the adaptive expertise required for effective teaching.

In the present study the assistance and affirmation provided by working together in a community of practice with the added support of a mentor, along with the professional development mechanisms of reading, discussion, and analysis of lesson transcripts, eventually assisted the teachers to overcome their initial difficulties with reflection and change.

9.3 What changes occurred in the teachers' knowledge, thinking, and practice as a result of reflective professional development?

During this action research project, within the supportive environment of a community of practice and with the assistance of an outside facilitator, Anne and Ruth were able to develop both their reflective skills and their ability to critique their own practice. Participation in discussion over a period of nearly two years allowed the teachers to share their areas of strength and expertise, to identify gaps in their knowledge, and at the same time to develop the knowledge and skills required to address areas of need.

Participation in the study increased the teachers' knowledge of learning theory and of alternative practice. Some of our discussion focused on constructivist and social constructivist perspectives of learning. This resulted in clarification of the teachers' knowledge and thinking concerning the nature and role of discovery learning, direct instruction, scaffolding, the mediation of learning, and formative assessment. In addition, reading and discussion that centred on classroom learning conversations, questioning, wait-time, and feedback, enabled the teachers to focus on the development of core teaching and learning strategies, particularly their questioning techniques.

An early outcome of our professional discussion was my request for the teachers to provide learning outcomes for individual lessons. This was an important trigger for reflection and change, resulting in a key turning point in the teachers' thinking. It enabled them to focus on learning in their planning, as opposed to activities, and encouraged greater consciousness of purposeful teaching. Both Anne and Ruth began to consider it a normal part of their practice to share learning outcomes with their students. In accordance with claims made by several authors (e.g., Assessment Reform Group, 2002; Clarke, 2003; Crooks, 1988; Sadler, 1989, 1998), the teachers were subsequently able to see the beneficial effects of this practice on their teaching and on student learning, as revealed by their comments at the end of Cycle Four (refer Section 8.2.3).

Through the process of examining the evidence in their lesson transcripts Anne and Ruth gradually developed greater awareness and ownership of their teaching practice. The opportunity to review their own teaching, spelled out in the form of written transcripts, enabled them to identify discrepancies between their espoused theories and their theories-in-use, and to identify routinised, counter-productive aspects of their practice. This was a catalyst for reflection that resulted in the establishment of goals for change and improvement. The teachers were anxious to change the practices that they were unhappy with, which prompted them to consciously develop their ability to engage in reflection-in-action in order to monitor their behaviour during their teaching, They were also motivated to engage more seriously with the literature about questioning and feedback.

Both teachers emerged from the research process having made fundamental changes to their knowledge, thinking, and practice, and with future professional development goals clearly linked to what they had learned (refer Section 8.2.6). In addition, developing their confidence in their ability to change and improve their practice had increased the teachers' sense of self-efficacy. It had also provided them with feelings of satisfaction and accomplishment, and perhaps most importantly, generated renewed enthusiasm and excitement about teaching and learning.

9.4 What changes occurred in learning conversations as a result of reflective professional development?

After the previously discussed regression, or deterioration, in the quality of their learning conversations in Cycle Two, both Anne and Ruth were determined to effect changes in their practice. In the third and fourth cycles the teachers were able to both critique their own practice and reflect much more effectively, to the point where they were able to recognise and articulate the discrepancies between their espoused theories and their theories-in-use. By the end of the fourth cycle both teachers had begun to use their new knowledge and understanding to bring about changes in their learning conversations with students.

Many of the changes in the teachers' learning conversations were qualitative, including subtle shifts in the types of teacher utterances in each category of the Hierarchy of Classroom Interactions that were too small to register in statistical analysis. Nevertheless, analysis of the overall changes in proportions of teacher utterances between Cycles One and Four to ascertain the practical significance of the action research process found a small effect size for both teachers (Anne .22, and Ruth .20). Given that Cohen (1988) himself contends that effect sizes in social, psychological, and educational research are frequently small, in part "because of the subtlety of the issue frequently involved" (p. 13), a cautious claim could be made for the present action research process as an effective model of professional development.

One of the outcomes of analysing their own lesson transcripts in light of the reading, discussion, and the Hierarchy of Classroom Interactions, was that at the end of Cycle Two, the teachers expressed a desire to specifically monitor and develop their use of questioning and feedback to students during Cycle Three. This was an indication of a breakthrough in their thinking about their pedagogy, particularly in relation to the links between effective questioning and feedback and deep learning. Indeed, questioning and feedback continued to be their core focus for the remainder of the study.

Our discussions related to the readings and to the Hierarchy of Classroom Interactions helped the teachers to specifically target the closed questions and "dead-end" feedback in their learning conversations. Both teachers made a conscious effort to increase their percentages of higher order questioning and feedback and were able to make small but incremental changes in their interactions with students in the final two cycles. Across the four cycles of research both teachers decreased their percentages of dead-end feedback, but notably, the most important changes in the teachers' pedagogy between Cycles One and Four were in their proportions of open and closed questions. Analysis of the changes in proportions of question types between Cycles One and Four to determine their practical significance found a small effect for Ruth (.29), and a medium effect for Anne (.49).

The Hierarchy of Classroom Interactions had provided the teachers with a framework that enabled them to identify weaknesses in their learning conversations. At the same time it had provided them with a "target" to aim for.

> *Anne: It gave me a target to aim for - more Level Three questions and feedback.* ***(Reflection Day: Cycle Four)***

> *Ruth: It helped me to organise things. It sort of spelled it all out really. I could see what I was doing too much of - in the tables - and what I wasn't doing enough.* ***(Reflection Day: Cycle Four)***

By the end of Cycle Four both teachers had been able to make many positive changes in their practice, resulting in improvements in the quality of their learning conversations with students. Many authors (e.g., Guskey, 1990; Poskitt, 2005; Stoll & Fink, 1996; Timperley, Wilson, Barrar, & Fung, 2006) claim that time, at least two years and as much as three to five years, is needed for professional development to bring about deep change in teachers' practice. In view of such claims, the present action research process, which brought about modest change in a little less than two years, may well have achieved greater change if it had been possible to extend the process over a longer period of time.

9.5 Implications for teacher education and development

Although the initial findings of the present study revealed that Anne and Ruth were very different in their teaching styles, the findings also highlighted strong similarities in the teachers' lack of knowledge of formal learning and assessment theory, the fragmented nature of their espoused theories, the routinisation of their practice and the shallowness of their reflection. These findings, along with the positive outcomes of the action research process, have implications for teacher education and development.

9.5.1 Implications for pre-service teacher education

It was a matter of some concern that both of the teachers who participated in the present study had such a superficial and fragmented understanding of learning and

assessment theory. The effects of their confused beliefs about constructivist learning theory on the quality of their learning conversations were of particular concern (Airasian & Walsh, 1997; Bransford, Brown, & Cocking, 1999; Bransford, Derry, Berliner, & Hammerness, 2005; Bullough, 2001; Hammerness, Darling-Hammond, & Bransford, 2005). Anne and Ruth had both qualified as teachers many years ago, and had very little memory of educational theory from their pre-service teacher education courses. However both teachers had been sufficiently committed to their professional development to have recently upgraded their teaching qualifications to an undergraduate degree by completing a special programme for practicing teachers. It is ironic, in view of the particular need of these two practicing teachers for more comprehensive and up to date knowledge of learning and assessment theory, that this special programme included only an optional paper in assessment and no papers in learning theory.

Darling-Hammond and Hammerness (2005) claim that substantial coverage of learning theory is essential in successful teacher education programmes. New Zealand pre-service teacher education degrees and diplomas contain a limited and finite number of papers, among which educational theory must compete for inclusion with practicum experience and study of curriculum in a wide range of subjects. According to Darling-Hammond, Pacheco, Michelli, LePage, and Hammerness (2005) one of the problems associated with traditional pre-service teacher education is the lack of time within existing programmes to effectively develop knowledge of subject matter, child development, learning theory, curriculum, and effective teaching strategies. In New Zealand, as in the United States and many other countries, neither of the two major tracks followed in pre-service teacher education programmes for primary teachers provides a comprehensive grounding in all areas. Within the past decade in New Zealand, as a result of changes in government funding policy, undergraduate degree programmes (already weak in subject content coverage) have been reduced from four years to three, resulting in many cases in reduced coverage of human development and learning and assessment theory. The graduate diploma programmes offered have at the same time been reduced from two years to one, and now provide at best a minimal coverage of human development and learning and assessment theory, and in some cases, none at all. Darling-Hammond, Pacheo et al. claim that such superficial coverage leads to a lack of deep understanding of theory, and an inability to

understand and handle real problems of practice. The findings of this study support this claim, and suggest that consideration should be given to lengthening New Zealand teacher education programmes, and to increasing their content of learning and assessment theory.

Another problem in pre-service teacher education referred to by Darling-Hammond, Pacheco et al. (2005) is fragmentation of course work. In most programmes the key elements of the knowledge base for teaching are taught in separate courses; subject matter is separated from pedagogy, pedagogy from human development, human development from learning theory, learning theory from assessment theory, and *all* course work is separated from practice. According to Darling-Hammond, Pacheo et al. student teachers are "left on their own to put it all together" (p. 447). Their concern is shared by Eraut (2000) who claims that this separation between theory and practice forces student teachers to develop theories in use separately, as they learn to cope with the complexity of practice. Eraut claims that this is what leads to a mismatch between espoused theories and theories-in-use. A number of experts (e.g., Colbert, Trimble, & Desberg, 1996; Darling-Hammond & Hammerness, 2002; Hammerness, Darling-Hammond, & Bransford, 2005; Lundeberg, 1999; Shulman, 1992) suggest that one way of overcoming this problem is to use case study methods to present essential information, in order to provide appropriate contexts to help students to integrate and synthesise what they are learning into a more coherent understanding. According to Darling-Hammond and Hammerness (2002):

> Through using cases, research suggests that students can learn to apply theory and practical knowledge to specific school contexts, can think through classroom dilemmas and suggest actions to be taken, can become metacognitive about their teaching, can examine personal beliefs, and can appreciate social, ethical, and epistemological growth (p. 127).

Another concern in the present study was the teachers' inability to effectively reflect upon or critique their own practice. Hammerness, Darling-Hammond and Bransford (2005) suggest that because teachers need to be reflective about their work, reflective skills should be developed in pre-service teacher education. In recent years many providers of teacher education in New Zealand have incorporated aspects of reflection and inquiry into their programmes, with varying degrees of success. Darling-

Hammond and Hammerness (2005) suggest that teacher educators can better emphasise the inquiry process by developing the skills of action research:

> Preparing teachers to learn from teaching throughout their careers requires a set of tools that develop the skills and practices of systematic, purposeful inquiry and critical reflection. Many teacher educators have focused on developing these abilities by engaging student teachers in systematic research in their classrooms and schools (p. 437).

Darling-Hammond and Hammerness believe that such experiences help student teachers overcome some of the limitations of their "apprenticeships of observation" (p. 437), and to deal with the complexity of practice.

Other authors (e.g., Cochrane-Smith & Lytle, 1993, 1999; Price, 2001; Tabachnik & Ziechner, 1999; Valli, 2000; Ziechner & Liston, 1987) advocate teaching action research skills in pre-service teacher education programmes in the context of communities of inquiry. Darling-Hammond and Hammerness (2005) suggest that communities of inquiry where groups of student teachers are provided with opportunities to engage in "lesson study" (p. 405) involving *joint* observation, analysis, and evaluation of lessons, may provide ideal environments in which to develop reflective and analytic skills while learning to teach. When student teachers learn to develop their teaching in collaborative contexts they develop the ability to both provide and receive feedback on their teaching in a positive and constructive manner (Hammerness, Darling-Hammond, & Bransford, 2005; Joyce & Showers, 2002). Such communities also develop the ability to work with others and promote a collaborative approach to planning and teaching (Darling-Hammond, Pacheco, Michelli, LePage, & Hammerness, 2005; Hammerness, Darling-Hammond, & Bransford, 2005). Action research in communities of inquiry can play an important role in pre-service teachers' learning, by developing the habit of actively seeking feedback from many sources, and by promoting an approach in which reform and inquiry continue to be seen as a natural part of teaching across the entire professional lifespan (Cochrane-Smith & Lytle, 1993; Hammerness, Darling-Hammond, & Bransford, 2005).

9.5.2 Implications for in-service professional development

The findings of this study reflect the claims of a number of authors (e.g., Bransford, Derry, Berliner, & Hammerness, 2005; Dreyfus & Dreyfus, 1986; Eraut, 1994, 2000; Hammerness, Darling-Hammond, & Bransford, 2005; Schon, 1983; Somekh, 2006; Yero, 2002), that the practice of experienced classroom teachers is often strongly influenced by their implicit beliefs and routinised behaviours, regardless of their teaching styles, the depth of their pedagogical content knowledge, or the comprehensiveness of their espoused theories. Many experts in the field of reflective professional development (e.g., Eraut, 1994, 2000; Hammerness, Darling-Hammond, & Bransford, 2005; Timperley & Robinson, 2001; Yero, 2002) agree that unless teachers are assisted to develop their reflective skills to the point where they are able to critique and monitor their own behaviour in the classroom, such routinised and unreflective practice will be unlikely to change.

Shulman and Shulman (2004) contend that learning is more effective when it is accompanied by reflection and metacognitive awareness, and is supported by membership in a learning community. According to Fullan, Cuttress, and Kilcher (2005) learning from peers within the school setting is one of the most powerful drivers of change. In collaborative cultures, teachers are more likely to develop a common sense of purpose, to be able to cope with uncertainty, to respond to rapid change, to create a climate of risk taking, and to develop a stronger sense of self-efficacy (Hargreaves & Fullan, 2000). Collective problem solving involves a process of continuous improvement and adaptation in the face of complex challenges. This results in deep learning and sustainable change (Fullan, 2005b).

Although the present study demonstrated that bringing about changes in teachers' practice is a slow and complex process, the systematic experiences provided within the four cycles of action research eventually proved to be effective in assisting the teachers to develop the requisite knowledge and reflective skills to bring about change in their practice. Involving the teachers in the process of collecting and analysing data within their own classroom settings was a powerful catalyst that facilitated reflection and change.

However, according to Salzman, Snodgrass, & Mastrobuono (2002):

> In spite of action research's ability to help teachers gain unexpected and valuable insight into the realities of their own classrooms, there appears to be limited motivation at both the pre-service and in-service levels to help teachers develop action research skills (p. 2).

Instead there has been a tendency to cling to the traditional patterns of staff development that Fullan and Hargreaves (1996) claim are often individualized, episodic, and weakly connected to the priorities and needs of schools. According to Hargreaves and Fullan (2000) the benefits of traditional in-service professional development are seldom integrated into classroom practice, as "individual course-goers" (p. 51) often do not find what they have learned to be relevant to their immediate needs, and on their return to their schools they are frequently met by "unenthusiastic colleagues" (p. 51) who have not shared in the learning.

The findings of the present study suggest that if the intentions of professional development are to bring about change in teachers' thinking and practice, more emphasis should be placed on active methods that are relevant and meaningful to the teachers concerned. This study, in providing the participating teachers with opportunities to investigate and analyse their own practice, enabled them to identify discrepancies between their espoused theories and theories-in-use, to identify routinised aspects of their classroom practice, and subsequently to effect changes and improve the quality of their interactions with students.

9.6 Limitations of the study and implications for further research

The dual nature of this study eventuated in substantive findings about the knowledge, thinking, and practice of the participating teachers, along with findings related to the processes of reflection and change engendered by the action research process. Somehk (2006) contends that:

> There is much to be gained by adopting a dual approach: generating contextualized knowledge on the basis of careful, systematic inquiry, and evaluating this through action oriented towards improvement; while at the same time maintaining a critical skepticism and openness to different interpretations that iteratively challenge the action research "findings" in terms of both the appropriateness of the action and any claims to improvement (p. 27).

Participatory action research has been accused of both bias and lack of precision because it involves teachers in making subjective judgements in the process of evaluating their own practice. Therefore the findings of participatory action research are usually considered to be limited to the setting in which the research is conducted (Arhar, Holly & Kasten, 2001).

Although classical, positivist, social scientists prefer "scientific" research from which generalisations may be drawn, new-paradigm inquirers are increasingly concerned with individual experience and the epiphany, or moment of discovery (Christians, 2000). External validity, replication, and generalisation are no longer considered to be essential in educational research. Findings that are interpretively sensitive to specific contexts, conditions, individuals, and interactions may be considered to be equally valid (Scott & Weeks, 1998; Somekh, 2006; Stringer, 1996).

Somekh (2006) claims that given new understandings of the nature of knowledge "it is no longer possible to establish truths which are generalisable across contexts" (p. 27). She argues that knowledge developed through action research involving close partnerships between researchers and participants is validated when those in similar settings recognise its practical value, appropriate it, and relate it to their own context. Somekh argues that:

> Because of its contextualized nature, knowledge generated from action research is cautious in its claims, sensitive to variations and open to reinterpretation in new contexts. It is, therefore, not only more useful than traditional forms of knowledge as the basis for action but also more open than traditional forms of knowledge to accepting the challenge of its own socially constructed nature and provisionality (p. 28).

This study has provided interesting and valuable information about the effects of teacher knowledge and thinking on the quality of learning conversations in two New Zealand classrooms. It has also provided information regarding the effectiveness of a classroom-based model of action research for professional development in a New Zealand primary school setting. A criticism of the study might be that involvement of only two participants in an action research project in a single school setting limits the generalisability of the findings.

For this reason a broader study, involving a large number of participants across several schools, would provide useful information for pre-service teacher educators about practicing teachers' understanding, interpretation, and application of learning and assessment theory in a New Zealand context. In addition, further investigation on a wider scale into discrepancies between teachers' espoused theories and theories-in-use, and into the routinisation of teachers' practice, would inform approaches to in-service professional development.

It would be interesting to expand the present action research design, and to conduct it with a whole syndicate or school. Another possibility might be to conduct it across a cluster of schools working together, where the participants are not interacting or working together on an everyday basis, which may allow them to feel safer in critiquing their practice and in declaring their inadequacies (Fullan, 2005).

The focus of the present study was limited to teacher behaviours, and there was consequently no data collected to determine whether the changes in the teachers' practice, such as the sharing of learning outcomes and the improvement of the quality of their learning conversations, had affected student achievement. Future studies could be expanded in scope to include student perspectives on changes in teacher behaviour, and the collection of data concerning student achievement.

In the present study unanticipated difficulties were encountered, firstly with the participating teachers' limited skills in reflection, and secondly with the initial regression (Fullan, 2005a; Perkins, 2003) that occurred in their practice. The regression that occurred in the teachers' practice in Cycle Two may be an unavoidable aspect of the process of change, and possibly an essential stage of any action research process. With hindsight, the difficulties encountered with the teachers' reflective skills may perhaps have been averted by a more extensive trialing of procedures (familiarising the teachers with transcripts of their own lessons and introducing them to elements of discourse analysis), before the commencement of more formal data collection. Such a trial would have enabled more comprehensive scaffolding of the participants' skills in critiquing and reflecting upon their practice.

Although it was not possible in the present study (because Anne moved to a new school), another potential step for future research would be to use this action research model to provide the participants with the structure, skills, and techniques to continue the process independently. Three or four cycles could be conducted with the support of an outside facilitator, followed by another cycle or two in which the participants continue the research independently, collecting and analysing their own data, and seeking out relevant literature for themselves in order to support their inquiry.

Finally it would be interesting to use The Hierarchy of Classroom Interactions in a wider study, with a larger group of teachers. The hierarchy could be used to provide substantive and, on a wider scale, more generalisable information concerning the nature of teachers' learning conversations with students. At the same time it would be a useful tool to support the participating teachers in critiquing their own interactions with students. The hierarchy could be refined, adapted, and developed further, to include a broader and more comprehensive range of categories, possibly incorporating the "synthesis" and "evaluation" levels of Bloom's (1956) Taxonomy.

9.7 Concluding comment

The findings of this study have highlighted discrepancies between the theoretically based, idealised teaching and learning envisioned by academics, and the practicalities of the classroom in which teachers with limited theoretical knowledge struggle to cope with complex and competing demands. The study established that routinised behaviours and implicit beliefs had a powerful influence on the quality of the practice of the participating teachers, regardless of their teaching styles, their pedagogical content knowledge, their espoused theories, or their classroom experience. This finding has important implications for teacher education and professional development.

In addition, the study has demonstrated the effectiveness of classroom-based action research as a model for reflective professional development. If professional development is to bring about lasting change and improvement in teachers' practice it must involve the teachers concerned in analysing and critiquing their *own* classroom

practice, in order to identify their routinised behaviours and to resolve the discrepancies between their espoused theories and their theories-in-use.

> *I cannot teach clearly unless I recognise my own ignorance, unless I identify what I do not know, what I have not mastered (Freire, 1996, p. 2).*

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APPENDICES

APPENDIX A

The Principal,
…… School,

Dear ……..,

I am a senior lecturer in Education at the Auckland College of Education, and I am about to embark on the data collection phase of my Doctor of Education Degree, investigating the role that teacher-pupil conversations play in learning and formative assessment. My interest in this topic has arisen partly through my academic study and partly through observation of teachers and student teachers in classrooms. I have chosen to use action research methodology to carry out my study so that I can share the knowledge that I gain with the school and teachers concerned.

The title of my research project is:

Changing Learning Conversations: An Action Research Model of Reflective Professional Development

I would appreciate the opportunity to carry out my fieldwork at ……. School because I have been impressed with the competence and professionalism of the teaching staff when I have visited the school to observe student teachers.
Once ethical approval has been gained for the project from the Massey University Human Ethics Committee, an informal expression of interest in the project would be followed by the more formal process of gaining informed consent from the Board of Trustees, participating teachers, children, and parents or caregivers.

Could you please indicate whether you are interested in having teachers from your school involved in this action research project?

Yours sincerely,
Jenny Harnett
Senior Lecturer in Education
Auckland College of Education

APPENDIX B

The Principal and Chairperson,
Board of Trustees,
……..School.

Dear ……..,

As a lecturer in Education at the Auckland College of Education I have developed a strong interest in the role that teacher-pupil conversations play in learning and formative assessment. This has arisen partly through my academic study and partly through observation of teachers and student teachers in classrooms. I have chosen to study this area of interest for my Doctor of Education degree in order to learn more about the ways in which classroom teachers interact with children in learning conversations.

The title of my research project is:

Changing Learning Conversations: An Action Research Model of Reflective Professional Development

I have chosen to use action research to carry out my study so that I can share the knowledge that I gain with the school and teachers concerned. The study will provide professional development for the participating teachers through opportunities for discussion and reflection about the learning conversations in their classrooms.

I am writing to ask for your approval to carry out my research at …… School. I would like to work at …… School because I have been impressed with the competence and professionalism of the teaching staff when I have visited the school to observe and assess student teachers
Three teachers would be involved in the study. I would be working with the participating teachers and their classes in the following ways:

Participant Involvement

- Audio recorded observation of teachers and children during classroom learning conversations for periods of approximately 60 minutes during normal classroom hours, once a week for six weeks during each research cycle
- Brief [10 – 20 minute] informal interviews and meetings with individual teachers after school hours

- Group meetings with the three teachers for feedback and reflection [funding for whole day release from classroom responsibilities will be provided for this purpose]
- A formal audio recorded interview with each of the teachers [one hour] after school hours
- Occasional [one or two] five minute discussions with children about the learning conversations that they have been involved in

Project Procedures

- All information would be collected in complete confidence and pseudonyms would be used in reporting
- Information obtained during classroom observations would be discussed privately with the individual teachers concerned
- Information from interviews and observations would be analysed into themes, and discussed with the group
- All data generated would be securely stored in my home for a period of five years, and it would then be destroyed.
- A summary report would be made available to the school on completion of the project

Participant's Rights

Participants would have the right to:

- decline to participate
- decline to answer any particular question
- withdraw from the study up until the time the data is analysed
- ask any questions about the study at any time during participation
- provide information on the understanding that names will not be used unless permission is given to the researcher
- be given access to a summary of the project findings when it is concluded
- ask for the audio recorder to be turned off at any time during interviews and classroom observations

Contact Information

If you have any questions about the study please contact:
Jenny Harnett, Senior Lecturer, Auckland College of Education, (Ph. 09 623 8899 Ext 48743, Email j.harnett@ace.ac.nz)

OR:

Dr. Jenny Poskitt (Senior Lecturer, Massey University College of Education).
(Ph.06 356 9099, Ext. 8835, Email j.m.poskitt@massey.ac.nz)

Committee Approval Statement
This project has been reviewed and approved by the Massey University Human Ethics Committee, [PN Protocol No: 02/143]. If you have any concerns about the conduct of this research, please contact Professor Sylvia V Rumball, Chair, Massey University Human Ethics Committee: Palmerston North, Telephone 06 350 5249, email S.V.Rumball@massey.ac.nz.

If you wish for ……. School to participate in this study, please sign the Consent Form and return it in the addressed and stamped envelope provided.

Yours faithfully,
Jenny Harnett
Senior Lecturer
Auckland College of Education

APPENDIX C

CONSENT FORM

[Principal / Board of Trustees]

Project Title:

Changing Learning Conversations: An Action Research Model of Reflective Professional Development

THIS CONSENT FORM WILL BE HELD FOR A PERIOD OF FIVE (5) YEARS

We have read the Information Sheet and the details of the study have been explained to us. Our questions have been answered to our satisfaction, and we understand that we may ask further questions at any time.

We give consent for this research to be carried out at …….. School.

Signature [Principal]: ..... **Date:** .....

Full Name – [Printed] .....

Signature [Board Chairperson]: ..... **Date:** .....

Full Name – [Printed] .....

APPENDIX D

INFORMATION SHEETS
[PARTICIPANTS, PARENTS, AND CAREGIVERS]

RESEARCH PARTICIPANT INFORMATION SHEET

[Teachers]

Project Title:

Changing Learning Conversations: An Action Research Model of Reflective Professional Development

Researcher Introduction

- This research will be conducted by Jenny Harnett (Senior Lecturer in Education, Auckland College of Education).
- This research is to partially fulfill the requirements of a thesis to complete a Doctor of Education Degree (Massey University).
- The research will be supervised by Dr. Jenny Poskitt (Senior Lecturer, Massey University College of Education), and Dr. Alison St.George (Senior Lecturer, Massey University College of Education).

Purpose of the study

As a lecturer in Education at the Auckland College of Education I have developed a strong interest in the role that teacher-pupil interactions play in learning and formative assessment. This has arisen partly through academic study and partly through observation of teachers and student teachers in classroom contexts. I see this study as an opportunity to contribute to knowledge in this area.

I have chosen action research as my methodology in order to provide professional development opportunities for the participating teachers. The provision of feedback on their role in classroom learning conversations, along with opportunities for reflection and discussion, will assist the participating teachers to refine and enhance their practice, and increase learning opportunities for students.

The study will involve the participating teachers in four cycles of action research. The first cycle will involve classroom observations and teacher interviews, and subsequent cycles will be planned collaboratively with the participating teachers.

You are invited to participate in this study.

Participant involvement

Procedures in which you will be involved include:

- An initial meeting to explain the study and select a curriculum area of focus
- An audio recorded individual interview [approximately 1 hour, after school hours]
- Audio recorded observations of classroom learning-teaching-assessment interactions for periods of approximately 60 minutes during normal classroom hours, once a week for six weeks in each cycle of the study.
- An individual meeting held in a private space outside of classroom teaching time to discuss and clarify recordings and field notes from each of the classroom observations [These meetings will take approximately 5 – 10 minutes]
- Group meetings with participating teachers for feedback and reflection at the end of each observation cycle [whole day release from classroom responsibilities for this purpose]

Children's involvement

- The children in each participating classroom will have the study carefully explained to them by the researcher
- Children and parents/caregivers will be provided with Information Sheets about the study, and will be asked to complete Consent Forms
- Information about children who do not complete signed Consent Forms will not be included in the reporting of the study
- Children will be observed and recorded along with the teacher as they contribute to classroom learning conversations
- The researcher may discuss with participating children their interpretations of learning conversations

Project Procedures

- All information will be collected in complete confidence and pseudonyms will be used in reporting
- Information obtained during classroom observations will be discussed privately with the individual teachers concerned
- Information from teacher interviews and classroom observations will be analysed into themes, which will be discussed with the teachers as a group.
- All data generated will be securely stored in the researcher's home for a period of five years, and it will then be destroyed.
- A summary report will be made available to the school on completion of the project

Participant's Rights

You have the right to:

- decline to participate
- decline to answer any particular question
- withdraw from the study up until the time the data is analysed
- ask any questions about the study at any time during participation

- provide information on the understanding that your name will not be used unless you give permission to the researcher
- be given access to a summary of the project findings when it is concluded
- ask for the audio recorder to be turned off at any time during interviews and classroom observations

Project Contacts

If you have any questions about the study please do not hesitate to contact Dr. Jenny Poskitt at Massey University College of Education, Palmerston North (Ph. 06 356 9099, Ext. 8835, Email j.m.poskitt@massey.ac.nz.

Committee Approval Statement
This project has been reviewed and approved by the Massey University Human Ethics Committee, PN Protocol No: 02/143. If you have any concerns about the conduct of this research, please contact Professor Sylvia V Rumball, Chair, Massey University Human Ethics Committee: Palmerston North, Telephone 06 350 5249, email S.V.Rumball@massey.ac.nz.

If you agree to participate in this research, please sign and return the attached Consent Form.

Thank you

Jenny Harnett
Senior Lecturer
Auckland College of Education

RESEARCH PARTICIPANT INFORMATION SHEET

[Children]

Project Title: Classroom Talk: How Teachers Help Children Learn

This year I will be working in your classroom with your teacher to find out more about how she helps children learn.

If you want to be part of this study I would like to:

- Listen to and record you talking to the teacher about your learning
- Talk to you about what you have learned
- Look at some of your school work

You do not have to join in the study.

- If you do join in the study you can tell me if you do not want to answer a question or if you want me to turn off the recorder
- The things that you say to me or to the teacher will be private.
- I will not write your name in my work.
- If you have any questions about the study please talk to your teacher or to about them.
- If you do join in the study tell me if you do not want to answer a question or if you want me to turn off the recorder.

If you want to be in this study please sign the Consent Form.

Thank you
Jenny Harnett

RESEARCH PARTICIPANT INFORMATION SHEET

[Parents/Caregivers]

Project Title:

Changing Learning Conversations: An Action Research Model of Reflective Professional Development

Research Information

This year I will be researching in this school to complete a Doctor of Education Degree.
I will be working with teachers to find out the ways teachers and children talk together about learning.
I will be observing and recording the ways teachers and children talk together about learning.
I will only be interested in conversations related to learning and assessment.
I will only be interested in conversations that the teacher is involved in.
I will not be observing or recording personal conversations between children.

The Board of Trustees has given approval for this study.

Children's Involvement

I may need to:

- Observe and record teachers and children during classroom learning conversations for sixty minute periods once a week
- Talk to your child about some of the learning conversations that he/she has with the teacher

You have the right to:

- Not have your child involved at all
- Withdraw your child from the study at any time
- Ask any questions about the study at any time

If you do not agree for your child to take part in this study he/she will continue to take part in normal classroom activities without being observed.

All in formation will be confidential, and your child's name will not be recorded.

The research will be supervised by Dr. Jenny Poskitt (Senior Lecturer, Massey University College of Education).
It has been approved by the Massey University Human Ethics Committee.

Contact Information
If you have any questions about the study please contact:
Jenny Harnett, Senior Lecturer, Auckland College of Education, (Ph. 09 623 8899 Ext 48743, Email j.harnett@ ace.ac.nz)

OR:

Dr. Jenny Poskitt (Senior Lecturer, Massey University College of Education).
(Ph.06 356 9099, Ext. 8835, Email j.m.poskitt@massey.ac.nz)

If you have any concerns about this research, please contact Professor Sylvia V Rumball, Chair, Massey University Human Ethics Committee: Palmerston North, Telephone 06 350 5249, email S.V.Rumball@massey.ac.nz.

If you agree for your child to take part in this study please sign and return the attached Consent Form.

Thank you
Jenny Harnett
Senior Lecturer
Auckland College of Education

APPENDIX E

CONSENT FORMS
[PARTICIPANTS, PARENTS, AND CAREGIVERS]

CONSENT FORM
[Teachers]

Project Title:

Changing Learning Conversations: An Action Research Model of Reflective Professional Development

THIS CONSENT FORM WILL BE HELD FOR A PERIOD OF FIVE (5) YEARS

I have read the Information Sheet and the details of the study have been explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree/do not agree to the interviews and classroom observations being audio recorded.

Signature: ..... **Date:** .....

Full Name – [Printed] .....

CONSENT FORM
[Children]

Project Title: **Classroom Talk: How Teachers Help Children Learn**

THIS CONSENT FORM WILL BE KEPT FOR FIVE (5) YEARS

The research has been explained to me.
My questions have been answered, and I know that I may ask more questions.
I agree to be in this research.
My parents/caregivers have read this form.

[If you do not want to join in this study do not sign this form.]

Signature: ..... **Date:** .....

Full Name [Printed] .....

CONSENT FORM
[Parents / Caregivers]

Project Title:

Changing Learning Conversations: An Action Research Model of Reflective Professional Development

THIS CONSENT FORM WILL BE HELD FOR A PERIOD OF FIVE (5) YEARS

I have read the Information Sheet and have had the study explained to me. My questions have been answered, and I understand that I may ask further questions at any time.

I give consent for my child to take part in this study.

I give consent for my child's conversations with the teacher to be recorded.

Signature: ..... **Date:** .....

Full Name – [Printed] .....

APPENDIX F

CONFIDENTIALITY AGREEMENT
[Teachers]

I ..... (Full Name - printed)

agree to keep confidential all information concerning the following project:

Changing Learning Conversations: An Action Research Model of Reflective Professional Development

Signature: ..... **Date:** .....

Full Name – [Printed] .....

APPENDIX G

INTERVIEW QUESTIONS

- Approximately how long have you been teaching?
- What teacher education and tertiary qualifications do you have?
- What professional development programmes have you undertaken in the last five years?
- To what level have you studied English?In what subject areas do you feel most confident?
- What do you do when you are unsure of your own content knowledge?
- What strategies do you use to make information understandable to learners?
- What ideas about learning influence the way you teach?
- What is your philosophy of teaching?
- What do you think formative assessment involves?
- How do you use formative assessment in your classroom?
- How important do you think it is for you to know what children are thinking?
- How do you go about finding out about this?
- What kind of feedback do you find is useful for learners?

APPENDIX H

(EXCERPT TRANSCRIBED FROM OBSERVATIONAL FIELDNOTES)

CYCLE ONE / FIELDNOTES 2
OBSERVATION: RUTH 1 27/05/03

Arrive at school at 8.30. Observing in Ruth's room only today as Anne's consent forms are not all back. See Susan in staffroom. She informs me that she will be leaving the school at the end of the term and is unsure whether it will still be possible to include her in the study. She will not be particularly accessible in her new school (school is a long distance from my home, work, and the original school, and her new role involves only part-time classroom teaching due to significant administrative release time for responsibilities of Deputy Principal), and it would create issues renegotiating ethics and informed consent of school and children.

<u>English lesson in Ruth's classroom, 9.15.</u>
Children are seated on mat. Ruth turns off tape for interruption from messenger. I ask her to leave it on next time as interruptions may end up being significant to the study.

Ruth reads through poem with children – it is written in 19th century English, and is about convicts in Brisbane. The language is not particularly accessible. Ruth constantly interrupts the reading of the poem to explain vocabulary.

The lesson involves teaching of content about the Australian penal system, vocabulary development, and dictionary skills. For some words Ruth asks children to look up words in the dictionary. After 45 minutes, this to my mind is becoming rather tedious. I keep expecting the children to lose interest, but they are remarkably attentive.

At the end of the discussion Ruth plays a professionally recorded rendition of the poem on tape. Many of the children's faces visibly "light up" as the poem "comes to life'. They are particularly ecstatic when "Captain Logan" meets his fate.

Although the vocabulary had seemed to me to be impenetrable to the children as they worked through the poem, their understanding of the complete poem at the end, when Ruth plays the recording, is astounding. They are totally absorbed, enthusiastic, and fully involved in the ensuing discussion, -an example of how far children can be moved through questioning, discussion, and high expectations?

APPENDIX I

EXCERPT TRANSCRIBED FROM ANNE'S REFLECTIVE JOURNAL

11/05/04 Lesson NZ Idol.

- Assumed all would be interested, some hadn't seen it - boys found it very hard to consolidate ideas and transfer thinking to themselves being famous
- Talk, paraphrase difficult for girls - mostly listened & were able to 'retell' one idea their partner shared
- Redirection of task sheet still left some unmotivated (boys) - interest low
- Not enough visual
- Never assume interest!!!
- On reading the transcript I could actually see some progression of thinking taking place through discussion, guided listening, sharing ideas
- Have I changed anything?

STILL NEED TO:

- Listen/paraphrase to ensure all children have heard during discussion
- Move to Level 3 more quickly and give less instructions
- Allow for 'wait time' and quicker interaction on part of students
- More consciously connect to L.O.s during lesson & refer children to reasons for what they are doing
- Need to probe more to achieve outcomes

APPENDIX J

Glossary of Terms for Hierarchy of Classroom Interactions

Acknowledging:	Acknowledging information, knowledge, understanding, etc., contributed by a student
Administration:	Pertaining to "school office," administration, messages, etc.
Challenging:	Question to challenge students' thinking or point of view
Clarifying:	Clarifying confusions, partial understandings, making meaning clearer, etc.
Confirming:	Confirming that a student contribution or response is correct
Correcting:	Correcting incorrect information, misunderstandings, errors, etc.
Cuing:	Question to cue or prompt a predetermined response
Directing:	Telling students where to go, where to sit, whom to sit with, who to work with, what materials or books to use, etc.
Elaborating:	Providing more, extra, more detailed, more complex information
Establishing prior knowledge:	Question to ascertain what students already know or understand
Explaining:	Explaining why, how, what for, "so what?"
Extending:	Question to extend student thinking or take it to a higher or more complex level
Framing:	Statement to place lesson or information in a context, e.g., "Today we're going to be learning about …. that happened …."
Inferential:	Question to encourage reasoning, logic, to determine implications, to encourage how, why, "so what" thinking, etc.
Instructing:	Telling students how to go about a learning activity, e.g., "Read pages 9 and 10 and write a brief summary."
Linking:	Linking to prior knowledge/previous lesson

Managing behaviour: Encouraging or rewarding appropriate behaviour
Redirecting off task behaviour
Discouraging or punishing inappropriate behaviour

Metacognitive: Question intended to encourage students to think about how, why, they are doing or thinking something

Motivating: Acting, modeling, enthusing, etc., to encourage student interest

Negating: Saying "No," e.g., to an incorrect or inappropriate response

Personal /Humour: An exchange with a student concerned with a personal matter, e.g., demonstrating interest in student wellbeing, family, etc., making a joke, pun

Praising: Praising a correct response, answer, action, completed task, etc.

Recapping: Going over material covered previously in same lesson/or [occasionally] a previous lesson

Repeating: Repeating a student utterance verbatim

Routine: Pertaining to classroom routines and rules, e.g., giving out books, scissors, taking lunch orders, etc.

Telling: Telling students basic information e.g., what, when, where, how much, etc.

Transferring: Assisting students to apply information, understanding, knowledge to a new or different situation or context

APPENDIX K

EXCERPTS FROM ANALYSED TRANSCRIPTS OF OBSERVED LESSONS

Utterances		Categories
27.05.03 (Cycle 1/Observation Transcript/R/1)		
Ruth	*"My back with flogging is **lacerated.**" What does it mean? … it's a big fancy word for something.*	est. prior knowledge
P:	*Concussion*	
Ruth:	*Oooh, no, … That's a good guess though. Not concussion P. "**Lacerate**". I **love** it!*	negating / praising
	*Next time you do something to your finger, run into the kitchen and say, Mum! Mum! I've **lacerated** my little finger!*	motivating
P:	*Cut?*	
Ruth:	*Cut! …. We could save a lot of energy if we just used these little words, couldn't we?*	repeating
	Think of all the ink they used when they wrote lacerate when they just could have written cut!	humorous
	Why would they use the word lacerate? Rather than cut?	inferential
P:	*It makes you try to figure out what the word means?*	
Ruth:	*Yes, it does.*	confirming
A:	*It's expression.*	
Ruth:	*Yes. It makes you **feel** something when you read it.*	confirming / explaining
	*If you'd gone inside with a **cut** finger, Mum and Dad would probably just say "Oh, just run it under the tap." But if you run inside and say "Mum, I've **lacerated** my finger!" - they'd probably go "Oh **heavens**!" Because lacerate is a really powerful word.*	elaborating

12.08.03 (Cycle 1/Observation Transcript/R/3)		
Ruth:	*You are finishing this paragraph. Brian sat down. There came a point where he didn't care whether the meat was cooked, "I'm going to eat it" he thought …*	framing / telling
	So…. Your next line might be "Brian carefully took the bird from the stick … and …?	cuing
A:	*Swallowed it?*	
Ruth:	*Well … that would be the end of your story if he swallowed it whole. [Laughter] That wouldn't do justice to the fact that this is his first meat for a month, would it? … A? …*	challenging / humour
	*No … so you've got to **elongate** it. You've got to stretch it out a bit. If the author wrote stories like that it'd be all over in one page. It would be … you know … "Brian flew through the air. The plane crashed. He had his hatchet. He killed a bird. Someone saved him, and off he went home". That would be a very uninteresting story. …*	negating / explaining
	What's another word you could use here?	extending
H:	*Scoffs?*	
Ruth:	*He **scoffs**! Beautiful! He scoffs it!*	repeating / praising
	*I mean he hasn't had meat in months! He **rips** the flesh off! He **shoves** it in his mouth! He chews, he **gags** because he's put so much in there. Oh man! Excellent!*	motivating / humour

26/0803 (Cycle 1/Observation Transcript/A/5)	
Anne: Tell me what you found out.	est. prior knowledge
J: [Reads*] Scientists have discovered water skaters* [pond insects] *can go 50, 150 centimetres a second. … That's fast! They found it using high tech … high technology and a high-speed camera.*	
Anne: Mmmm. What period of time do you think would have been that they had to do this? How long do you reckon it would have taken them?	inferential
J: It would probably have taken a couple of years.	
Anne: Why do you think that?	inferential
J: Because they have to … um… make the high tech bug and they have to …um … get the cameras? And they have to research them and find some of them first.	
Anne: Excellent!	praising
And would it always be the same? Would the environment these things are in always be the same?	inferential
J: Ah no! Not always.	
Anne: ***How*** *would the conditions change? You know… Would it always be suitable for them* [scientists] *to be doing this work?*	inferential
J: No. Otherwise they [water skaters] *might die or something. If some of them die then they might become endangered if they keep on doing it.*	
Anne: That's right. Good girl! Well done! You've thought about that a lot.	confirming / praising