Promoting Student Thinking in Primary School:

Successful Strategies in New Zealand's Year 3-6 Classrooms

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Abstract

This thesis examines the promotion of student thinking by six primary school teachers in Auckland, New Zealand. All students think; however, cognitive research indicates the powerful ability teachers have to *promote* higher levels of student thinking. In a rapidly changing world, the researcher believes now is an ideal time to link relevant literature to the practices of New Zealand primary teachers.

This study has three aims: firstly, to investigate why the teachers believe in the significance of promoting student thinking; secondly, to examine what the teachers are doing to facilitate higher levels of thinking by investigating their teaching practices and learning environments; and lastly, to provide descriptive examples of how New Zealand teachers in Year 3-6 primary classrooms are promoting student thinking.

The qualitative, case study research design provided descriptive data that was subsequently analyzed. This study was undertaken in three phases to achieve the research aims. The first phase asked teachers to assess their promotion of student thinking on a written scale. The second phase involved the observation of lessons that the teachers believed facilitated higher levels of student thinking. Individual interviews comprised the third and final phase of this study. The collection and triangulation of the data informed the analysis from which emerged the common themes and results.

The teachers represented a range of experience levels and worked in schools with differing socio-economic statuses. All teachers believed in developing the children 'holistically' with consideration of the children's academic, social, emotional and physical growth. They involved their students in collaborative activities, stressed the importance of literacy, and included time for children's reflections. Discrepancies in the extent to which children were engaged in metacognitive activities and the school support received by the teachers appeared to be the largest disparity. The differences and similarities provide important discussion points.

The researcher suggests that successful approaches to promoting student thinking are first and foremost in the hands of teachers. This research indicates that teachers can independently develop their professional knowledge in this area; however, a whole school promotion of student thinking benefits the teaching staff and the student body, which in turn can positively affect New Zealand.

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Chapter 1

Introduction

Thinking has been the topic of philosophical and psychological discussions for centuries. Still a focal point for debate, educationalists include students' thinking skills in the long-standing argument over the amount of time dedicated to the *process* of learning versus the acquisition of knowledge or *content*. Students' thinking abilities are a critical issue currently considered in debates surrounding the school reforms experienced by many nations. This study, *Promoting Student Thinking in Primary School: Successful Strategies in New Zealand's Year 3-6 Classrooms,* investigates the phenomena of teaching thinking in primary schools. In the context of this research, 'thinking' is defined as the cognitive resources and strategies that promote the "the ability to reason; to make informed judgments; to critically evaluate information; and to think creatively" (Pohl, 1997, p. 6).

Bloom and his colleagues developed a taxonomy of cognitive levels: knowledge, comprehension, application, analysis, synthesis and evaluation (Bloom, Englehart, Furst, Hill, & Krathwohl, 1956). Though there is a need for all levels of thinking, promoting student thinking in the context of this research refers to developing the higher cognitive levels: analysis, synthesis and evaluation with the ability to apply these skills to reach a deeper understanding. The research examines the practices, viewpoints and motivation of six primary school teachers who believe in the importance of facilitating higher levels of thinking in their classrooms. Working with New Zealand teachers in Year 3-6 classrooms, the data derived from the teachers' self-assessments, classroom observations and teacher interviews is examined relative to literature in this dynamic field. A critical, complex and contemporary issue, recommendations for the promotion of student thinking are addressed in the concluding chapter.

BACKGROUND TO THE RESEARCH

This study resulted from the researcher's own teaching experiences, curiosity, and commitment to lifelong learning. Having taught for two years in the United States, one year at an International School in Europe, followed by three years in New Zealand, the researcher had varied teaching experiences but lacked the theoretical background to identify her style of teaching until she began postgraduate studies in New Zealand. Through the post-graduate courses and her personal research she was able to name her belief in acting as a guide and facilitator while scaffolding the children's learning experiences. This approach engaged the learners in an exciting collaborative journey and comprised essential elements of the *constructivist* approach in education.

As a teacher from overseas who was inexperienced in New Zealand's system of education that has been greatly influenced by the *Tomorrow's Schools* reform policies, the researcher continually questioned features of this 'new' teaching and learning environment. Why were schools competitors? Why were meetings, paperwork and accountability, rather than a focus on teaching and learning, allowed to fill mammoth portions of teachers' workloads? Why was there a teacher shortage so profound that foreign educators were actively recruited to relocate to New Zealand? Investigating the answers to these questions and more led the researcher into an examination of the political influences on education.

When exploring the politics of education, philosophical considerations underpin rationales relating to the purpose of education and subsequent policies and structures. Investigating these underlying issues provides focal points for discussion. The range of justifications for the purpose of education presented in this thesis includes the three educational rationales of creating lifelong learners, upholding democracy and an economic rationalization. By recognizing the differences between these rationales a clearer understanding of the reasons behind the current 'thinking movement' emerges. It will be found that facilitating higher levels of thinking in students exists in each espoused rationale, however each has a different purpose for promoting student thinking. These will be explored in Chapter Two.

While studying, the researcher continued to teach full-time, working with students in the middle and upper primary school. Still teaching under a constructivist philosophy,

the importance of thinking skills and the development of students into independent lifelong learners took precedence in her classroom. Concurrently, the researcher was investigating and exploring various strategies for teaching thinking skills and the Essential Skills. The Essential Skills in the *New Zealand Curriculum Framework (1993)* encompass creative, valuing and practical life skills. Utilizing such frameworks as Gwen Gawith's Action Learning (1988), Edward de Bono's Six Thinking Hats (1992), and Bloom's taxonomy of higher level thinking skills (1956), personal and anecdotal evidence pointed to the success of thinking skills in a constructivist classroom, empowering students to take charge of their learning and creating immense job satisfaction for the teacher.

Curious to discover more about the environment and attitudes necessary to consciously *promote* student thinking, the researcher decided to investigate the practice of other educators interested in promoting higher levels of thinking in their classroom programs. The researcher recognizes that the political and philosophical rationales behind the current educational design in New Zealand and much of the world should be scrutinized and considered when deciding upon the best 'thinking' environments. The primary focus of the research remained centered on the teachers, because of their critical roles in learning environments. Within the current political school structure some teachers actively promote student thinking with elements of success. Yet their reasons for striving towards this goal do not always support the current economic rationale behind New Zealand education. Though political and philosophical issues greatly affect the structure of learning and their influences should not be considered passively, the researcher focused her attention on the teachers, investigating "better methods of teaching in the existing subject-based curriculum, which also promote more effective thinking" (Maclure & Davies, 1991, p. xxvi). Therefore, a case study approach involving teachers with ranges of experience and from schools in the Auckland area with varying socio-economic statuses or decile rankings was proposed.

Many teachers look beyond the curriculum achievement objectives when planning for their lessons with some teachers consciously promoting student thinking in their classrooms. Arguably the greatest successes come from teachers who guide and facilitate learning in an environment that values and celebrates thinking. These teachers work in an intuitive manner and reflect upon their practice with or without the

support of colleagues. Reflection by the students is built in to the program to provide students with the practice, experience, and the discourse to analyze and evaluate their own work and the work of others. Through this discourse children begin to explore metacognition, learning to articulate their thinking processes and developing an ability to control them. The teachers create a culture of thinking that is alive with inquiry, where curricular areas are integrated, cooperative learning prevails and a variety of tools are utilized to facilitate a powerful community of learners.

Several of these participating teachers work within supportive structures, surrounded by interested colleagues or as part of a whole school approach. Yet there are also teachers who pursue the promotion of student thinking out of a personal interest, working relatively independently in their quest. Furthermore, some teachers would like to focus on promoting higher levels of student thinking and are making some progress, while others are unsure of the best ways to begin this journey or advance further. In the *Tomorrow's Schools* environment it is difficult to find time to explore any topic of interest outside the consuming requirements of the school and day-to-day teaching despite the rhetoric advocating emphasis on the Essential Skills. This research hopes to assist teachers in making a start or progressing one step further in their professional knowledge about promoting students' thinking in the classroom.

A lack of New Zealand based research related to this topic provided a further reason to conduct this study. Add to that the author's deep interest in the promotion of student thinking as an important means for becoming the best teacher possible. Moreover, this research aims to contribute to the world of teaching and learning, a dynamic field in which we can all be lifelong learners.

The fieldwork for this research was carried out in Term 3 and 4 of 2001 while the researcher was teaching a Year 4, 5, 6 class. The three-level combination meant that children aged 8-11 were learning together in the same classroom. Though not typical of New Zealand middle and upper primary classes, this type of grouping does occur in many schools and is often referred to as a 'whanau' or vertically grouped class whereby the students become a 'family'. Many of the rural schools in New Zealand also have similar cross-age groupings. Though they usually include only two year levels, composite classes are common in New Zealand and are more easily managed than in other countries because the curriculum focuses on the independent student

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achievement levels rather than specifying objectives that must be 'covered' at each year level. In this structure strategies such as peer tutoring, cooperative learning and ability grouping are common.

After receiving permission from the Massey University College of Education Ethics Committee, data gathering began. Promoting higher levels of student thinking is an issue important for *every* child. A particular gender or cultural focus was not an objective of the research though the researcher recognizes that factors that shape thinking are not free of social and cultural influences.

Data gathering commenced with a distribution of information packets explaining the study to selected schools in the Auckland area. In an effort to locate teachers who were consciously promoting student thinking, the choice of schools was determined by prior involvement in professional development related to this area. After reading the information in the packets, principals were asked to approve their teachers' participation in this study and distribute self-assessments to interested teachers. While several principals indicated that the research was relevant to their schools, the response rate to the self-assessment mailing was low. Many principals cited an overworked staff and lack of time as the reasons for their decisions not to ask their staffs to participate. Participation in this research was voluntary so any teacher who completed a self-assessment did so because s/he possessed a genuine interest in the topic. In a few instances the principals were keen to have teachers at their schools involved but the teachers themselves were not. The teachers' disinterest in the research was attributed largely to concerns about the time involved in participation. The researcher, however, purposefully structured the design so that each teacher's time commitment did not exceed three hours. The researcher recognizes that teachers could also have been reluctant to be 'models' or were not consciously promoting higher levels of thinking in their classrooms.

The self-assessment responses from the teachers provided the data for Phase One of this research. After receiving the completed self-assessments, the researcher decided upon six teachers to continue into Phase Two based upon their responses. Phase Two comprised classroom observations of lessons that the teachers believed promoted student thinking. Shortly after the observations, Phase Three commenced and the

researcher asked each teacher twenty-seven questions in a focused interview that allowed for open responses.

PURPOSE OF THE RESEARCH

The purpose of this study is to describe how New Zealand middle and upper primary school teachers are consciously promoting student thinking. The main aims for this research are:

- to investigate why the teachers believe in the significance of promoting student thinking
- to examine what the teachers are doing to promote student thinking by investigating their teaching practices and the learning environments
- to provide descriptive examples of how New Zealand teachers in Year 3-6 primary classrooms are promoting student thinking

Fulfilling the research aims requires an investigation of three research questions:

1. Why do teachers believe that promoting student thinking is important?
2. How are teachers in New Zealand middle and upper primary schools consciously promoting higher levels of student thinking?
3. How have teachers interested in promoting student thinking developed their professional knowledge in this area?

Through the case study methodology, classroom-based research can develop closer links to actual practice. Various forms of information can be gathered, strengthening the analysis through triangulation. A case study allows the researcher to become immersed in the learning environment and develop profiles of successful teachers to which other educators may relate. It is hoped that through this research, the descriptions and analysis will stimulate a reflective evaluation of teaching practice and challenge the readers.

ORGANIZATION OF THE THESIS

The research is organized into chapters to facilitate the ease of reading and understanding. Chapter One states the phenomenon under investigation: the conscious promotion of student thinking by Year 3-6 teachers in New Zealand. This chapter

outlines the background behind this study including the motivation of the researcher, relevance, and a brief overview of the research process.

Chapter Two consists of a review of literature which brings a theoretical and historical understanding to the current learning environments in the middle and upper primary school classrooms in New Zealand. This chapter seeks to clarify the term "thinking skills," and what it means to promote student thinking thus allowing for a shared understanding of the issue. While the importance of promoting student thinking appears to be gaining momentum, opinions on the 'best' methods vary, therefore debates in the 'thinking movement' are described. Literature linking constructivism, a philosophy advocated by thinking experts, as a theoretical basis for promoting student thinking is examined followed by a discussion about diversity in thinking. Promoting higher levels of student thinking has possible implications on individuals, society, and the nation. Thus, lifelong learning, democratic and economic rationalizations present varying justifications for the promotion student thinking

Chapter Two continues with an examination of the New Zealand's educational reforms in the late 1980s and 1990s brought about by the Education Act of 1989 and referred to as *Tomorrow's Schools*. Set against a tapestry of worldwide change due to the impact of the technical revolution on multiple areas of life, a presentation of the affects of the 'information age' informs the arguments surrounding the purpose of education. The role of the teacher cannot be ignored when teaching for thinking and the teacher's underlying philosophy impacts upon the instruction in the classroom. Educating in the information age is followed by an exploration of four approaches that experts in teaching thinking recommend in order to advance students' cognitive development: metacognition, creating a climate for thinking, direct thinking skills instruction and learning experiences with guided support and interactions with thinking. Chapter Two concludes by addressing the professional development issues that surround promoting student thinking.

Chapter Three outlines the framework within which the research was structured. The research design is based upon a qualitative approach because of the importance in the perceptions of the teachers and students, and the language they use. This chapter continues with a detailed description of the methodology utilized to conduct this research and considers ethical issues integral to the research.

In Chapter Four, six teachers and their lessons aimed at demonstrating examples of encouraging student thinking are profiled. This chapter reports the results which were extrapolated from the research's three primary information sources: the self-assessment scales, observations and interviews. Each data source is coded and individually analyzed. The results within each source are compared and similar themes emerging from all three data sources are highlighted.

The research questions frame the discussion in Chapter Five. The research results are examined in relation to the literature presented in Chapter Two. From the results, the researcher identifies key issues that contribute to the promotion of student thinking in the middle and upper primary school classrooms. Limitations of the study are included in this chapter.

In Chapter Six, conclusions related to the promotion of student thinking in the New Zealand Year 3-6 primary classrooms are drawn together. In addition, recommendations for teachers, principals, and the government are included in this study followed by suggestions for further research.

SUMMARY

Through critical reflection and analyses of many issues, the researcher aims to uncover elements in the promotion of student thinking found in Year 3-6 classrooms in New Zealand. All students 'think' but it is the continuous and conscious efforts of the teachers to promote thinking that this research examines in the context of New Zealand middle and upper primary schools. 'Thinking skills' are not another subject to 'cover'; rather they include attitudes and tools that can be utilized cross-curricularly to enhance the depth of understanding in various topics. Thinking skills are essential if education is to provide learners with the cognitive capabilities they will need in a world we cannot predict. However, the 'skills' must be evident to the learner as well as to the teacher in order to fully develop their use of and effectiveness in promoting student thinking. Therefore, the influences affecting teaching methods and the elements of the thinking culture: metacognition, classroom climate, direct thinking skills instruction and learning experiences with guided practice, combine with the results from this research to form a report on the promotion of student thinking in New Zealand primary schools.

Chapter 2

Literature Review

Investigating questions and issues surrounding thinking, a cognitive process every human engages in, is derived primarily from two domains: philosophy and psychology. Philosophical perspectives on thinking examine the "nature and quality of thinking and its role in human behavior" (Marzano, Brandt, Hughes, Jones, Presseisen, Rankin, & Suhor, 1988, p. 8). Early philosophers, Plato, Aristotle and Socrates, pondered cognition in an effort to discover 'truth' through the act of thinking. Relevant to educational settings, Socrates stressed the importance of a community of inquiry. Now referred to as Socratic questioning and teaching, Socrates posed open-ended questions and purposefully challenged ideas through inquiry to explore and reflect on issues (Ross, 1993). Socratic teaching is directly linked with critical thinking.

In the mid-1800s, the field of psychology burgeoned and proposed that the mind was a dynamic organ that could be scientifically investigated (Marzano et al., 1988). Analyses of thinking processes emerged linking behaviors and understanding abilities to the human mind (Resnick & Klopfer, 1989). In this period, teaching and learning gained importance and society began to believe that all children should attend school, instead of only an elite few. At the turn of the 20th century, developments by psychologists such as Thorndike indicated that humans were born with 'inert' or relatively unchanging cognitive abilities (Maclure & Davies, 1991). This belief strongly impacted teaching and learning, and "all too frequently, educators have ineffectively measured learners' potential" (Liebmann & Colella, 1997). The investigations of later cognitive psychologists such as Piaget, Bruner, Vygotsky, Feuerstein, Gardner, and Sternberg indicate that intelligence is changeable. Many educators are incorporating these research findings into their program in order to meet the needs of all learners. However, a century after Thorndike's assertions, the belief in a 'fixed' intelligence remains pervasive though it is slowly beginning to dissipate.

Thinking has been a pertinent issue for thousands of years and remains an integral component of education today; therefore what defines the 'thinking movement'? What

motivational factors are behind the thinking movement in relation to educational reforms and what does it mean to *promote* student thinking?

THE THINKING MOVEMENT

The effort to consciously promote thinking in education for *all* students is sometimes referred to as the 'thinking skills' movement (Perkins, 1992). Yet, the term 'skills' narrows the understanding of this complex issue. 'Skills' are often interchanged with tools and the use of a tool is not greatly affected by contextual, cognitive and attitudinal factors. In the thinking movement, thinking skills are viewed as tools to enhance cognitive abilities. Psychologist Grigorenko (1998) elaborates, "Just as they invented physical tools to extend their physical capacities, humans created the tools of the mind to extend their mental abilities" (p. 202).

Promoting student thinking involves encouraging critical and creative thinking and developing the ability to apply these elements. Ennis, a prominent researcher on thinking, defines critical thinking as "reasonable, reflective thinking that is focused on deciding what to believe or do" (cited in Marzano et al., 1988, p. 146). Having researched creativity for over 30 years, Csiksentmihalyi (1996) describes creativity as a mysterious and complex process of innovation that emerges from a balance between the challenge of a task and a person's skill level. The ability to apply critical and creative skills in thinking is referred to as a 'practical' skill by Sternberg (2000) in his triarchic model for thinking (Sternberg, 1985) or as an 'operacy' skill by de Bono (de Bono, 1991). Developing and applying the skills of criticism and creativity involves more complexity than learning how to use a tool. Thus, in the context of this investigation, the research defines the term 'thinking skills' as the cognitive resources and strategies that promote "the ability to reason; to make informed judgments; to critically evaluate information; and to think creatively" (Pohl, 1997, p. 6).

After two decades of experimenting with various methods, "most authors and developers of major cognitive curriculum projects agree that direct instruction in thinking skills is imperative," (Costa, 1991, p. 36). However, debate as to whether or not thinking skills should be separated from or infused into the curriculum areas exists. In *Learning to Think: Thinking to Learn (1991)*, the direct method and the infusion approach to teaching thinking skills are examined. Simply defined, supporters of the

direct instruction of thinking skills advocate that thinking skills should be taught as a separate 'subject'. This concept is supported because of the focus on thinking procedures. Proponents of this approach also believe that without a specific program, thinking skills could become neglected in a crowded curriculum. Programs advocating the direct instruction of thinking skills include de Bono's CoRT (Cognitive Research Trust) thinking skills method (1973) and Feuerstein's Instrumental Enrichment program (1980). Supporters of the infusion approach contend that content cannot be divorced from skills, therefore student thinking should be developed by focusing on the thinking strategies embedded within particular subject areas (Maclure & Davies, 1991). They believe that without the content, thinking skills have no meaning. The Philosophy for Children program is an example of this approach (Lipman, Sharp, & Oscanyan, 1980).

No assurances have been proven for the exclusivity of either method. Yet the inability of students to apply 'real-life' uses of the thinking skills taught to them through the direct skills instruction programs that prevailed in the 1980s has resulted in a third belief: "to combine the explicit teaching of skills with content" (Rasmussen, 1998, p. 1). Teaching thinking skills within the curricular allows content to be the medium for the application of thinking and thinking to act as the means for understanding (Beyer, 1998). Beyer explains this complex relationship:

> Thinking is affected and shaped as much by the subject matter to which it is applied as that subject matter is shaped by the kind of thinking that is employed to process it... *We can and should teach thinking skills and subject matter at the same time* (1998, p. 137, italics in the original quote).

Azuma, a Japanese researcher on thinking supports this belief stating, "If we want our students to learn to think, we should look not only into the process of thinking but also at the context where thinking takes place" (Azuma, 1991, p. 192).

PROCESS VERSUS CONTENT

In education a long-standing debate exists over the process versus content in teaching and learning. Process is the "how of learning," whereas content is "the what of knowledge" (Costa & Liebmann, 1997, p. xxi). Traditionally schools have emphasized content over process, however arguments over the priority given to and the amount of time dedicated to teaching content versus processes may soon be resolved. The

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'either/or' debate is devolving in response to the notion of adopting "a process approach to teaching and learning that actually increases the learning of content" (Pogrow, 1997, p. 98). The massive amounts of information available in today's global and technological world make the *content* in almost any discipline easily accessible; therefore, it is the responsibility of the teacher to help the student make meaning from this vast array of information through the *process* of learning (Melchior, Gawith, Edwards, & Keany, 1997).

The emphasis on the process of learning is not a new concept. Last century saw the production of many 'study skills' manuals to enhance learning strategies by practicing prescribed skills. However much of the advice lacked supportive research and was unsuccessful in having a formative influence on a student's learning (Blagg, Balinger & Gardner, 1988). 'Study skills' were essentially aimed at finding better ways to memorize content, rather than utilize higher cognitive processes. In addition, they were primarily aimed at older students who had already established learning habits and routines. Teaching thinking skills delves deeper into student learning than study skills. With significant possible outcomes, promoting thinking skills should therefore begin in primary school.

In the preface to their book, *Supporting the Spirit of Learning: When Process is Content (1997)*, Costa and Liebmann suggest that "we are on the verge of a paradigm shift – content will become the mechanism by which we teach process" (p. xv). A paradigm is a conceptual framework that serves as a basis of a theory. A paradigm shift in science occurred when Copernicus refuted the established belief that the sun revolved around the earth. By offering evidence that, in fact, the earth revolved around the sun, Copernicus initiated a shift so grand that it was not readily accepted (Cross, 2000). Similarly, research and technological advances are challenging traditional assumptions about learning. Cognitive investigations combined with viewing knowledge as a dynamic rather than static process, indicate that the intellectual abilities of humans are not predetermined. This realization is leading to a paradigm shift in how the ability to learn is viewed, thus, "the role of the educator needs to shift from the information provider to one of a catalyst, coach, innovator, researcher, and collaborator with the learner throughout the learning process" (Costa & Liebmann, 1997, p. xxii).

CONSTRUCTIVISM AS THE THEORETICAL BASIS FOR PROMOTING STUDENT THINKING

Leaders in the 'thinking movement' advocate constructivist elements in the classroom in order to effectively teach thinking (Costa, 1991; de Bono, 1994; Edwards, 1999; Perkins, 1992). A constructivist epistemology is grounded upon the active construction of knowledge by the learner. This is based on the prior knowledge of the learner and it focuses on the child as a learner rather than the content to be taught (Becker, 1999; Brooks & Brooks, 1990; Lai, 1999). Under a constructivist framework, "the development of the learner's unique abilities becomes the central focus of the learning environment" (Costa & Liebmann, 1997, p. xxii). Content is important yet it should be relevant to everyday situations to allow the student to inscribe more meaning upon it and to engage the students in the process of learning. Constructivism advocates that members of a learning community must work together to co-create an understanding, therefore the ability to communicate, analyze, and collaborate becomes imperative.

Educational philosophers and cognitive psychologists supporting constructivist tenets are John Dewey with his emphasis on real learning experiences and field experiments; Piaget's and Papert's belief in learning experiences where the hands-on element aids in the construction of meaning; Vygotsky's notion of social interactions and the zone of proximal development; Bruner's belief in instructional intervention and the teacher's role in scaffolding the lesson; Feuerstein's encouragement of engaging students in the process of learning rather than the product; and Gardner's theory of multiple intelligences in which learners have particular areas of strength that affect the best way they learn, think and interact with each other (Fogarty, 1999; Roblyer & Edwards, 2000).

Constructivist teaching is much more demanding, time consuming, and challenging and teachers must be adequately prepared to meet those formidable obstacles (Windschitl, 1999). Students need sufficient time to solve problems, collaborate, locate resources for their inquiry, and reflect upon their learning experiences and strategies. Ideally teachers and students should work together towards an acquisition of skills and knowledge with teachers employing various approaches to promote purposeful learning. In a constructivist classroom, students are engaged in problem-based activities in which the teacher guides their individual learning, important because of

the significance of direct experience advocated by Dewey, Piaget and Papert. As the teacher guides students by employing various means including Bruner's scaffolding, confusion is deterred by strategically reducing the complexity of the task (Windschitl, 1999). In this situation elements of Vygotsky's theory of social interactions and Feuerstein's instrumental mediation are often evident between the student and teacher. The role of the mediator is not limited to the teacher-student relationship, allowing for students to act as guides for each other throughout learning experiences.

Despite the lack of government focus on teaching thinking, notable by the absence of Ministry of Education officials at the Ninth International Thinking Conference held in Auckland, New Zealand in 2001, New Zealand teachers may have an advantage over educators from other nations because of the constructivist philosophy that underpins much of the classroom practice. Referred to as a 'new pedagogy' in a 1990 *Computers in NZ Schools* journal article, constructivism has been common in New Zealand classrooms for over a decade (Hodson, 1990). Widespread national endorsement of this pedagogy exists, evidenced by the constructivist tenets common in the Ministry of Education document, *Science in the New Zealand Curriculum (1993)*. The open-ended opportunities prevalent in a constructivist classroom can frighten some educators (Brooks & Brooks, 1999), thereby leading to an avoidance of creating this type of classroom culture, yet constructivism is a supported philosophy of teaching and learning in New Zealand primary schools.

Additionally, the Ministry of Education has offered "Curriculum Integration" contracts to primary schools. An integration of subjects is a characteristic of constructivism because when the curriculum is fragmented subjects can seem unrelated, leading to the development of more superficial, simplified understandings. Exploration of the natural links that exist between the disciplines can facilitate understanding. The emphasis on an integrated curriculum allows for flexibility of time, motivation, linking knowledge and prior experience (Hansen & Olson, 1996; Windschitl, 1999). The integrated curriculum establishes a teaching and learning design that differs from traditional educational planning and more accurately mirrors the 'real world,' providing a platform for transfer (Perkins & Salomon, 1992). The question of 'transfer' first surfaced in educational psychology and remains a key issue in thinking skills discussions. Transfer means, "the use of knowledge or skills acquired in one context in

another" (Perkins & Salomon, 1992, p. 202). Therefore, school planning that integrates the curriculum areas expands the notion of teaching for transfer in the classroom by a skilled practitioner, to the goal of the entire school (Clark, 1992).

DIVERSITY IN THINKING

The paradigm shift from an emphasis on content to process supports the development of the thinking skills that are needed in this increasingly multicultural world. By focusing on process, the focus shifts from *what* people think to *how* they think (Costa & Liebmann, 1997). Eggen and Kauchak (1999) highlight three strategies that have been effective in dealing with diversity: a general attitude of acceptance and caring, positive expectations, and valuing differences in learners (p. 19).

When examining the process of teaching and learning, it is important to recognize that teachers and students are individuals with particular abilities that they bring to the experience. Acknowledging this factor, allows for the inclusion of wider perspectives about 'best' teaching and learning methods. The inclusion of expansive viewpoints when promoting student thinking facilitates valuing the unique cognitive contributions from people of each gender and varied ethnicities (Liebmann & Wright, 1997).

Cross-national thinking research has discovered that various cultures value different information sources to help construct meaning (Azuma, 1991). An investigation by Azuma involved Japanese and American students asking for data to make a more informed judgment on a particular situation. The Japanese asked for more feeling-oriented information while the Americans asked for more factual information, a difference Azuma attributes to culture. Azuma argues that the Japanese approach may render a solution more acceptable in Japan and an American approach may render a solution more acceptable in the United States; nevertheless, "a successful programme for encouraging thinking must include plans for embedding the problem in a meaningful context, motivating children and organizing a peer culture which will encourage thinking" (Azuma, 1991, p. 196).

Though enhancing thinking and its application at various levels "depends very much on cultural context," thinking is a cognitive capability found in all people regardless of gender or ethnicity (Azuma, 1991, p. 194). Therefore, creating a 'culture' of thinking in the learning environment plays an important role in fostering thinking and is very

relevant in this increasingly multicultural world. Thinking programs such as De Bono's Six Thinking Hats (1992), which has experienced great popularity with multiple nations throughout the world, aim to assist in the creation of this 'culture'. No specific literature examining the relationship between the promotion of thinking skills and Maori, the indigenous people of New Zealand, was located.

RATIONALES FOR EDUCATION

Identifying the rationales behind the thinking movement requires an examination of the purpose of education. Lifelong learning, upholding democracy and economic rationalism combine and stand alone as justifications for education. Recognizing the differences between these purposes, informs an understanding behind the reasons for the thinking movement. A discussion of these rationales for education follows.

Lifelong Learning in Education

Many philosophers, psychologists and educators would agree that becoming a lifelong learner by developing an inquiring mind is an obvious rationale for education (Marzano et al., 1988). Educational philosophers John Dewey and N.F.S. Grundtvig envisioned education as important in fostering a yearning to learn (Goodlad, 1997; Olssen & Matthews, 1997; O'Neil, 2000). Literacy provides an important channel for developing a desire to learn about the world and viewing life as an "endless intellectual and personal quest for knowledge and meaning" (Sarason, 1990, p. 163).

A closer examination of what 'literate' means replaces the simple notion of literacy as the ability to read and write. Literacy has evolved from the simplistic position of the reading and writing 'basics' to embrace the more complex stance of 'excellence', which includes higher levels of thinking and more sophisticated levels of analysis and application (Freire, 1970; Giroux, 1988; Lankshear & McLaren, 1993). This critical and analytical emphasis promotes the notion of literacy as liberating and leading to open minds, rather than simply possessing the functional skill of reading and writing. Literacy is an essential life skill that empowers people to participate socially, culturally, economically and politically (OECD, 1997). Therefore, literacy is not limited to helping students master the tools and techniques of reading but encompasses the empowering ability for students to critically 'read' the world (Gee, 1999; Giroux,

1988; Hoffman, 2000). Promoting higher levels of student thinking in primary schools provides a foundation for the advanced concept of literacy necessary in today's world.

Historically, focusing on the promotion of students' thinking has remained in the realm of education for 'gifted' children but the same tenets have significant applications for the learning outcomes of *all* children (Azuma, 1991; Bloom, 1956; Costa, 1991; Renzulli, 1986). One example is Rueven Feuerstein's theory of mediated learning experiences. Feuerstein worked with traumatized children from World War II. Their development was believed to be retarded, however their cognitive abilities greatly improved through mediated learning experiences. His research firstly examined *how* the children learned through the 'Learning Potential Assessment Device' (LPAD), followed by directed experiences for overcoming identified learning deficiencies (Feuerstein, 1980). Using a dynamic assessment tool signified a great shift from the content measurements on traditional, static intelligence tests. Through his research, Feuerstein demonstrated the great potential of the human mind and refuted, along with other educators and psychologists the concept of an unchangeable intelligence quotient (IQ). Yet, Feuerstein's research has often been applied to 'gifted' children rather than the academic underachievers with whom he worked (Cathcart, 1994).

As the world continues to rapidly change, it is difficult to envisage the future and the knowledge that will be essential. However, the importance of thinking is not subject to change and "the ability to 'learn to learn' is surely more important than ever before" (Blagg et al., 1988, p. 7; Clark, 1992; Todd, 1993). It is critical in this ever-changing, high-tech world that *all* children experience opportunities to develop their thinking (Cathcart, 1994; Costa, 1991; Fogarty, 1998; Rasmussen, 1998). Thinking, is becoming a crucial element for teaching and learning in the primary school classroom to meet the intellectual, social, emotional and professional needs of all students.

Education for Democracy

In addition to believing in 'lifelong learning,' Dewey and Grundtvig advocated a philosophy of liberal education as a means of upholding democracy by creating informed citizens (Goodlad, 1997; Olssen & Matthews, 1997; O'Neil, 2000). Many in the Western world believe democracy is the best form of social organization that humans have constructed. In order to participate fully in a democratic society, citizens

must be literate and able to make informed choices. Supporters of the democratic ideal behind the purpose of education advocate that society will be better served by a more informed citizenry because they "will enhance the future for us all" (Clark & Wasley, 1999, p. 596). Without educating people to realize and recognize the importance that higher levels of critical thinking hold in making decisions and unveiling the constructs of power, the ability to challenge issues in politics, economics and society becomes difficult, if not impossible (Apple, 2000). Thus, concepts of lifelong learning and democracy through education merge when schools are described as the bases to "provide students with the kinds of experience that would contribute to the personal interests and habits of mind needed for democratic life" (Nodding, 1999, p. 580).

Economic Rationalization

Many cries have resounded to ensure society will have enough adequately prepared workers, locating the purpose of education within the domain of economic rationalism (Hoffman, 2000). The world's economy has undergone a global transformation, marked by "unprecedented levels" of trade between nations due to advances in technology and 'information' as a commodity (Dale & Robertson, 1997, p. 209; Reich, 1992). Technological changes have polarized forms of work and it is increasingly difficult for companies to find the highly-skilled workers they require in this global economy, thus compounding the issue of 'human capital' (Fitzsimmons, 1997; Levett & Lankshear; 1990; Spring, 1998; Toch, 1991). This technological revolution has the capacity to change the historical school structure and is an issue with implications for all societies.

Dewey outlined a philosophy of liberal education and democracy *within* the world of work but *without* a sacrifice to problem solving and 'life-long learning.' Yet, this balance was replaced by an economic rationalization for the purpose of schools stressed in the reform policies prevalent throughout the Western world in the 1980s and 1990s (Goodlad, 1997; Olssen & Matthews, 1997). Many reform policies were an attempt to counter the possibility of a major shortage of skilled workers. Under an economic rationale, employees capable of applying creativity and critical analyses are viewed as instrumental to improving the technology that the global economy values and relies upon (Bodmer, 1989; Spring, 1998). The concern over the economic viability of nations has contributed to the belief that schools are in need of reform.

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Teaching thinking skills such as analyzing, organizing, and evaluating has been targeted in efforts to boost the economic confidence of nations in the global economy. Therefore, having a more highly skilled, analytical and creative work force creates a national economic security by ensuring a competitive stance in the increasingly globalized world market (Bodmer, 1989; Jenkins, 1999).

NEW ZEALAND EDUCATIONAL REFORM

New Zealand educational policy shifted in the 1980s to reflect New Right ideologies including an economic rationale for education (Codd, Harker, & Nash, 1990; Fitzsimmons, 1997; Gordon, 1997; Olssen & Matthews, 1997; Openshaw, Lee & Lee, 1993; Peters, 1997; Snook, 1997; Thrupp, 1997). Within the paradigm of economic rationalization, the importance of education in developing a "desire to continue to learn about self, others, and the world, to live in the world of ideas and possibilities, [and] to see the life span as an endless intellectual and personal quest for knowledge and meaning" is either represented as a commodity or de-valued in favor of the language of the marketplace (Sarason, 1990, p.163; Hall, 1979). A Hayekian view of democracy as the protector of the market emerges, and thus, marketplace principles of competitiveness, privatization, and restructuring are evident in New Zealand education (Snook, 1997; Spring, 1998).

A critical evaluation of literacy, that is the language spoken and written in particular texts, such as in educational reforms and curriculum documents is imperative to understand ideologies which emulate a relation to power in any society (Friere, 1970; Gee, 1999; Knobel & Healy, 1998; Lankshear & McLaren, 1993). *Administering for Excellence (1988)*, commonly referred to as the Picot Report was commissioned by Prime Minister David Lange. The Picot Report recommended specific educational reforms and Lange outlined the implementation of these suggestions in *Tomorrow's Schools (1988)*.

While the original intention of the New Zealand reform proposals reflected a more 'public' purpose of education through equality and choice, these tenets were "stripped away to reveal an uncompromising commitment to market forces" (Peters, 1997, p. 26; Codd et al., 1990). In New Zealand, education has become a private commodity subject to market conditions, in accordance with New Right interpretations of reform

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policies. Yet the system has struggled to meet the market demand (Thrupp, 1997). The result from the difficulties in adapting to the neo-liberal reforms has been the development of a "quasi-market" of education in New Zealand, where the state has simultaneously implemented interventionist and non-interventionist policies (Gordon, 1997, p. 67; Fitzsimmons, 1997; Olssen & Matthews, 1997).

Encouraging market solutions can reproduce "traditional hierarchies of class and race" and the reforms have widened the gap between socio-economic groups in New Zealand (Apple, 2000, p. 234; Olssen & Matthews, 1997, Peters, 1997; Thrupp, 1997). A little more than a decade later, New Zealand is in the process of re-evaluating the direction of the reform policies. Publications like Thrupp's (1999) *A Decade of Reform in New Zealand Education: Where to Now?* and Smelt's (1998) *Today's Schools: Governance and Quality* indicate that the process of reform in this country, like others, is still evolving.

In recognition of the changing world, the Ministry of Education published a document to support the implementation of *Tomorrow's Schools* reforms, the *New Zealand Curriculum Framework (1993)*. The intent of this document was to influence instruction in the classroom by establishing "the foundation policy for learning and assessment in schools" (Ministry of Education, 1993b, p. 1). The *New Zealand Curriculum Framework (1993)* outlines eight essential skills necessary for success in the 21st Century: "Social & Co-operative skills; Self-management & Competitive skills; Problem-solving skills; Information skills; Communication skills; Numeracy skills; Work and Study skills; and Physical skills" (Ministry of Education, 1993b, p. 17).

Examining this educational document reflects the shift to the market-driven purpose of education, or economic rationalization. This rationale is clearly articulated on the first page: "If we wish to progress as a nation, and to enjoy a healthy prosperity in today's and tomorrow's competitive world economy, our education system must adapt to meet these challenges" (Ministry of Education, 1993b, p. 1). An economic emphasis is again singled out later in the document: "all essential skills are important if students are to achieve their potential and to participate fully in society, including the world of work" (Ministry of Education, 1993b, p. 17). The *New Zealand Curriculum Framework (1993)* replaces a stress upon 'knowledge' and 'understanding' with the acquisition of

information and skills (Ministry of Education, 1993b; Snook, 1997). These skills then become outcomes that can be directly taught to individuals instead of achieved through collaborative interactions between teachers and students.

Despite the intentions behind educational policies, actual implementation is often modified. Though the 'world of work' is specifically emphasized, the interpretations of this document can vary. Codd (1999) remarks on New Zealand's "long tradition of critical social thought" (p. 45) and Apple (2000) states, "many teachers do have socially and pedagogically critical intuitions" (p. 252). Targeted for all students throughout their entire schooling, these essential skills span the whole curriculum. Opportunities to advance student thinking are embedded as integral components, therefore promoting student thinking can be viewed as *essential* for all children to develop their full potential as lifelong learners, democratic citizens, and employees.

EDUCATING IN THE 'INFORMATION AGE'

Many schools have purchased information technology (IT) hardware and software in an effort to address the needs of education in the 'information age'. In the nascent stages of implementation, some countries viewed information technologies, specifically the computer, as possible substitute teachers however New Zealand did not adopt this viewpoint (Nightingale & Chamberlain, 1991; Ferguson, 1993). *A Study of Computers in New Zealand Schools* (1991) examined government policies and initiatives from the Department of Education (renamed the Ministry of Education in 1989) and acknowledged that though not all countries viewed IT in the same way, "educational computing in New Zealand was tending to focus on the use of the computer as a tool to enhance student learning" (Nightingale & Chamberlain, 1991, p. 19). In contrast, many Americans believed that the computer would replace the teacher as noted in a 1984 article in an American academic journal: "the threat that computers might replace teachers frightens us so much that we are not willing to develop careful plans for the introduction of computer technology into the schools" (Taffee, 1986, p. 253).

The inclusion of information technologies in education became an issue due in large part to societal and community pressure for children to be equipped with the technological, information and visual literacy required in this 'information age'

(Roblyer & Edward, 2000). In the United States, "public concern that the young wouldn't get jobs in the age of information made computers spread faster than any other electronic hardware" (Tyack & Cuban, 1995, p. 125). Many schools have "jump(ed) onto the technological bandwagon" without a clear rationale or a consideration of the problems and issues that may arise (Blackburn, 1999, p. 26). Regardless of technological advancements, pedagogical considerations should be the unwavering basis for educating in the 'information age':

> only when computer usage is located within a discourse of educational theory focusing on the nature of knowledge, teaching and learning will we be in a position to use this powerful technology in an educationally significant way (Hodson, 1990, p. 9).

Incorporating information technologies in education can be supported on a cognitive platform as well as economic. When working with these new technologies children can experience opportunities that engage them in higher-order thinking and cooperative learning. Developments in multi-media and Web-based learning help develop better mental models and the visuals can help poor readers gain and utilize information (Lai, 1999). Students become involved in decision making opportunities and encounter situations where they must be critical. In addition, information technologies are often motivational for children.

Though the catalysts for educational reform in the 'information age' vary, collaboration between cognitive psychologists, philosophers and educators has produced an emphasis that is being embraced by schools from many nations: promoting thinking in the classroom (Baron & Sternberg, 1987; Edwards, 1999). Art Costa, a recognized advocate of teaching thinking and developing students' intellectual habits remarked:

> We are riding the crest of what may be the greatest opportunity for educational reform in history: a growing dissatisfaction with the current quality of education; a realization of educational reform as a political platform; a heightened awareness of the demands of an uncertain future; a concern about our nation's global economic dependence upon an educated and highly skilled work force; and face-to-face encounters with our delicate ecological home (Costa, 1991, p. 167).

Many would agree with Costa's statement that combines elements of life-long learning, democratic and economic rationales into a single platform underlying the

reforms. The binding tenet found in these contrasting philosophical viewpoints is an emphasis on thinking. The late 1980s and 1990s have seen the production of vast amounts of research into this topic (e.g. Baron & Sternberg, 1987; Costa, 1991; de Bono, 1994; Edwards, 1999; Feuerstein, 1980; Lipman, 1991; Marzano, et al., 1988; Paris & Winograd, 1990; Perkins, 1992; Swartz & Perkins, 1990a; Swartz & Perkins, 1990b). As Edwards (1995) states, "There are sufficient research results to convince any serious reader of education research literature that the teaching of thinking should be a major focus for education in our schools" (cited in O'Brien, 2001, p. 2). Fogarty and Bellanca (1989) remind us, "creative and critical thinking are vital skills for our young people if they are to become productive problem solvers and mindful decision makers as they shape their world" (p. 5).

An emphasis on thinking, both critically and creatively is imperative. New models of thinking are necessary that employ problem solving techniques, creativity and analysis (Fogarty & Bellanca, 1989; President's Committee of Advisors on Science and Technology: Panel on Educational Technology, 1997). With the explosion of information available in the last decade through the advent of such technology as the internet, children have access to millions of texts and must be equipped with the tools to critically analyze and evaluate the vast amounts of information in order to effectively make meaning (McKenzie & Davis, 1986). Fullan (2000) concludes, "the more powerful technology becomes, the more indispensable good teachers are" (p. 582).

ACHIEVING THINKING DISPOSITIONS

How does one *promote* student thinking? Researchers Perkins, Jay and Tishman advocate the creation of particular 'dispositions' to encourage thinking (Perkins, 1992). Costa and Kallick (2000) refer to certain characteristics of thinking as the 'habits' of intelligence or the mind. Each list of dispositions or habits documents a range of characteristics that reach beyond the technical skills of thinking and are at the "heart of good thinking" (Perkins, 1992, p. 116). A comparison of the lists includes metacognition which is a self-awareness of one's own thinking and the ability to control it, continuous learning, clarity, and elements of risk-taking.

In order to promote thinking by establishing these dispositions or habits, the thinking classroom integrates several considerations to produce a 'culture' of thinking. Referred to as "approaches" (Beyer, 1998) or "elements" (Fogarty & Bellanca, 1989), they include: metacognition, the learning climate, explicit thinking skills instruction, and guided support and interactions with thinking (Beyer, 1998; Costa, 1991; Fogarty & Bellanca, 1989; Marzano et al., 1988; Perkins, 1993). An elaboration on these approaches for advancing thinking in the classroom follows.

Metacognition

Metacognition involves a self-knowledge or consciousness of one's own cognitive processes and the ability to control them when suitable, an ability that may be unique to human beings (Brandt, 2000; Swartz & Perkins, 1990a). Since the innovative research of Flavell and his colleagues in the 1970s, researchers have continued to explore the intricacies of metacognition (Winograd & Gaskins, 1992). Perkins (1992) identifies four levels of complexity within metacognition: the tacit level, awareness level, strategic level, and reflective level. At the lowest, tacit level, one is unaware of one's own metacognition. Possessing some knowledge the types of thinking one does represents the awareness level. The strategic level involves organizing one's own thinking for use in such strategies as problem solving and decision making. The highest level, the reflective level, combines the ability to be strategic in one's thinking with the ability to reflect on and revise strategies while thinking is in progress. By focusing on the processes in learning, students can begin to articulate their mental courses of action, thereby developing the levels of metacognition or 'thinking about thinking'. Students' achievements at the highest level of metacognition, the reflective level, are a necessary link to transferring thinking skills (Barell, 1992; Costa, 1991; Costa & Kallick, 2000a; Perkins, 1992; Winograd & Gaskins, 1992).

Literacy is key to thinking and learning because in order to be a part of a community of learners you must be able to express and contribute to your thinking processes by questioning, debating, conveying your point of view, clarifying and explaining. Costa and Lowery (1989) state, "language and thinking are inexorably linked" (p. 53). Several publications from researchers Tishman, Jay and Perkins discuss the relationship between thinking and language (Perkins, 1993; Tishman, Perkins & Jay, 1995; Tishman & Perkins, 1997). Communicating metacognitive strategies and ideas

often relies on oral language, a powerful tool for thought that is often taken for granted: "Perspective and challenging discussion strengthens the intellect, and provides for the best transfer of understanding and thinking skills across the curriculum" (Dalton, 1985, p. 7).

Understanding one's own dispositions towards various subjects and people is also an important element of metacognition (Barell, 1992; Costa, 1991). Recognizing how these subjects and people affect one's own reactions and decision making is sometimes referred to as emotional intelligence (Brandt, 2000). Teaching, with metacognition as an aim, has resulted in positive affects on student's self-esteem, motivation and independence (Clark, 1992; Paris & Winograd, 1990).

Many of the thinking skills programs in the 1980s were unsuccessful because students were unable to apply newly acquired skill into other learning situations. Perkins and Salomon (1992) have described the Little Bo Peep theory of transfer as the belief that the transfer of knowledge and skills from one area will occur automatically when it is needed in another area. The name is based upon the line in the nursery rhyme: "Leave them alone and they'll come home/ wagging their tales behind them," (Perkins & Salomon, 1992, p. 203). According to thinking skills experts, Gardner and Perkins, this type of spontaneous transfer is difficult because learning is context bound. By utilizing methods like strategic questioning or cueing, students can be 'reminded' of the thinking skill and transfer it across curricular (Beyer, 1998; Clark, 1992; Willis, 1998) reinforcing Beyer's assertion about concomitantly teaching thinking and the subject matter because of their interrelated connection.

Transfer "is the mission of the thinking classroom" so that learning can be extended and bridged between academics and life (Fogarty & Bellanca, 1989, p. 37). It is imperative that teachers are aware of the issue of transfer because of the critical roles teachers play in the classroom. Through teacher modeling, mediation and reinforcement, it is anticipated that transfer can occur (Feuerstein, 1980; Fogarty & Bellanca, 1989; Willis, 1998). The knowledge of teaching for transfer exists yet it is reliant on the teacher consciously fostering the conditions that facilitate transfer (Perkins & Salomon, 1992). Therefore, "the thinking classroom is a classroom in which the teacher purposefully gives priority to teaching students multiple ways to think about what they are learning and how to transfer these skills into more difficult

content" (Bellanca & Fogarty, 1991, p. 7). Research in student thinking and science education elaborates on how metacognitive processes can lead to better student understanding and encourages teachers to "strive for transfer as a measure of understanding" (Minstrell, 1989, p. 145).

Linking the Classroom Climate and Thinking Skills

A critical factor in any learning environment is the teacher. The teacher's influence is echoed in every aspect of classroom including the setup, management, tone, learning experiences, modeling, direction of discussion, classroom interactions, and level of instruction (King & Newmann, 2000). From the first day of school, every decision the teacher makes impacts upon the learner. Strother (1985) elaborates, "Effective classroom management and successful teaching are strongly linked to what teachers do in the first days of each new school year to establish a productive classroom climate" (p. 727).

Creating a setting in which thinking is valued involves creating a 'thinking culture' (Perkins, 1993). In this environment, risk-taking is encouraged in a community where the learners feel safe and all ideas are accepted (Rasmussen, 1998). The negative affects of giving 'wrong' answers are absent because the focus is on the process of learning not the product (Beyer 1998; Lipman, 1991). Explicit skills are taught such as comparing, contrasting, predicting, classifying, brainstorming, organizing information, fact finding, planning, analyzing and evaluating. Parks (1997) emphasizes the importance of developing a repertoire of thinking skills explaining:

> If curriculum significantly addresses improving thinking and learning processes, teachers and students must be familiar with different cognitive tools and understand how these tools help guide, picture and stimulate thought. Classroom instruction should include explaining and using a variety of these tools in content and personal application (p. 144).

Teachers in this 'culture' become strong thinking role models and provide opportunities for guided practice and application (Beyer, 1998; Costa, 1991; Palinscar & Brown, 1989). In addition to modeling they scaffold the learning by thinking aloud, offering advice on how they might solve a problem while highlighting and celebrating other examples of thinking produced by the children in the classroom. They value collaborative learning, reflections and explanations (Costa, 1991; Perkins, 1993).

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Student-generated questions are encouraged (Costa, 1991; McKenzie, 1997a; McKenzie, 1997b; Palinscar & Brown, 1989). They use written and verbal prompts or cues to assist students in completing tasks that would be too difficult for students to achieve independently (Eggen & Kauchak, 1999). Additionally they create an environment that encourages thinking by allowing wait time for students before responses are made or after questions are asked (Rowe, 1974 cited in Beyer, 1998; Perkins, 1993). They act as mediators to help children recognize their thinking patterns in order to determine which strategies are successful so that they can be applied to new situations that arise (Blagg et al., 1988; Feuerstein, 1980). Cognitive psychologist, Meltzoff, expresses the benefits and joy in watching teachers praise, prompt re-examinations in problem solving and encourage lateral thinking, as well as providing new information (D'Arcangelo, 2000). In addition, metacognition is more likely to be utilized when the lessons teachers plan are activities that the students find meaningful and worthwhile, thereby reinforcing the important influence the teacher has on promoting thinking in the classroom (Winograd & Gaskins, 1992).

Defining an environment that encourages student thinking has largely been based upon philosophical and psychological beliefs. However, due to recent technological innovations that are making it possible to study brain activity, researchers are now attempting to understand thinking *biologically* (Brandt, 2000). The 1990s has seen an increase in links between brain and developmental research with education (Diamond & Hopson, 1998; Gopnick, Meltzoff, & Kuhl, 1999; Jensen, 1998; Sylwester, 1995). Referring to the class climate from the perspective of the more recent brain-based educational research Meltzoff asserts, "Probably all of us, learn better in a stress-free environment," therefore "teachers should want to have non-threatening classrooms that foster exploration and discovery so that children can test their cognitive and emotional limits" (D'Arcangelo, 2000, p. 11).

With an emphasis on promoting student thinking, a teacher strives to establish an encouraging, interactive learning environment and construct learning experiences designed to stimulate and nurture cognitive and metacognitive development. Concerns about facilitating better understanding in his science students led Minstrell (1982, 1984, 1986) into cognitive and metacogntive research (cited in Minstrell, 1989). Minstrell (1989) advocates that teachers can facilitate higher levels of thinking and

understanding in their students by participating in research: "As a teacher, I would encourage other teachers to become involved in research related to the cognitive processes of their learners" (p. 147).

Developing Thinking Through Guided Support And Interactions

Cooperative learning in a constructivist classroom facilitates multiple learning benefits: valuing individuals for their varied capabilities and contributions, increasing oral language experiences and abilities, providing problem solving opportunities and peer tutoring. Many of these strategies are not new, but were pushed aside during the 'industrial age' when a more factory-like approach to school was embraced. Irrespective of prior academic achievement, cooperative learning demonstrates improved learning for students at all levels (Slavin, 1991). The success of such methods is shown in the "growing amount of evidence that thinking in the cooperative classroom shows the most powerful effects on learning even with the most traditional measuring tools" (Fogarty & Bellanca, 1989, p. 235).

Two theoretical viewpoints explain the success of cooperative learning: motivational and cognitive (McInerney & McInerney, 1998). The motivational supposition involves the reward of a group achieving a goal in a framework where each member is expected to contribute. Johnson and Johnson have conducted numerous in-depth research projects into cooperative learning since the early 1970s. Johnson and Johnson (1992, 1994) believe that cooperative learning promotes student thinking because of the importance of peer discussion for explaining and summarizing; opportunities for critical thinking when conflicts between members arise; incorporating varied perspectives and divergent thinking that comes from working with mixed groups; and considering the quality and value of feedback group members give to each other throughout the task (cited in McInerney & McInerney, 1998).

Vygotsky coined the term the Zone of Proximal Development (ZPD). By engaging students in ZPD or the "distance between the actual development 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," students learn to respect and value cooperative learning (Vygotsky, 1978, p. 86). Therefore, children can also be successful mentors to each other in a classroom.

When there is paired or small group learning students can act as mediators to facilitate shifts into higher levels of thinking and aiding in more challenging learning experiences for each other. Peer tutoring requires higher cognitive demands by expecting students to 'teach' or explain issues. Peer tutoring also promotes self-efficacy in students or a belief that they can control events in their lives, such as their learning (McInerney & McInerney, 1998). The excitement of discovery and the joys of meeting these challenges contribute to a climate of success, yielding more satisfaction for the teacher and the students (Paris & Winograd, 1990).

PROFESSIONAL DEVELOPMENT

Is teaching thinking an additional topic to teach in an already crowded framework? No, and yes. Teaching thinking is *not* another subject to teach because encouraging higher levels of thinking already exists in curriculum documents and policies, therefore the expectation is formally in place. However, for some teachers teaching thinking *is* another subject to teach because these requirements are not always reflected in classrooms (Rasmussen, 1998). Perkins (1992) expands on this contradiction:

> Notice the pattern: We want better thinking and learning strategies. We want connections to life outside school. We want understanding. And we want other things. But by and large we do not actually teach those things – not in the sense of providing direct information about them, not in the sense of providing thoughtful practice or informative feedback, not in the sense of making plain those objectives and pursuing them directly with students to harness intrinsic motivation. This is the great paradox of education: To a startling extent, we do not really try to teach what we want students to learn (pp. 70-71).

In an effort to teach 'what we want students to learn', the promotion of thinking involves a combination of the four previously mentioned approaches: the development of metacognition, the classroom climate, the explicit teaching of thinking skills, and guided interactions with thinking. The creation of a thinking culture is critical, but the four elements that promote student thinking do not occur together as often as desired because of the time required to increase teachers' professional knowledge and establish this vision in an overcrowded curriculum (O'Brien, 2001; Rasmussen, 1998). Professional development is a continuously evolving process and learning from successful teachers is "the most promising approach" (Willis, 2002, p. 8).

New Zealand teachers, like teachers in several other nations are under stress and time constraints as they try to balance the large number of curriculum demands and accountability with the daily learning in their classrooms (Edwards, 1999; Perkins, 1992; Sternberg, 1987). Without focusing in-depth on issues identified as important in the school or national vision, teachers often adopt a "token investment" into all the elements they are required to 'cover' in the classroom (Perkins, 1993, p. 162). While teachers may individually decide to focus on promoting the level of student thinking, an administrative vision could facilitate the continuation of these efforts, leading to greater student benefits over time (Perkins, 1993).

Teachers play critical roles in the classroom. The importance of facilitating higher levels of student thinking is vital, therefore even without support, a single teacher *can* initiate change in his/her classroom culture to promote student thinking. Perkins (1993/1994) explains the mindful and deliberate efforts teachers must incorporate in this endeavor:

> Creating a culture of thinking is an ongoing enterprise of consciousness raising for teachers and students. Perhaps most daunting is that it asks us as teachers to be more aware of the double nature of every action we take: every question, response, comment, and assignment not only carries a main message but a side-message, too, about our attitudes toward learning, thinking and the minds of others (p. 85).

While this may seem overwhelming, the results of these efforts are powerful (Paris & Winograd, 1990; Winograd & Gaskins, 1992). Teachers can choose to learn more about the range of approaches to teaching thinking with or without the support of their schools. Reading relevant literature and visiting other schools using various thinking methods is an important and practical step to increasing the promotion of student thinking (Rasmussen, 1998). Attending courses and experimenting in their own classrooms with a focus on student outcomes are strategies teachers have successfully engaged in to facilitate higher levels of student thinking in their classrooms (Fullan, 2000; King & Newmann, 2000). Linking professional development with practice deviates from the traditional, generic approaches of the past (Willis, 2002).

Costa and Garmston (1997) summarize teaching as "cognitively complex" (p. 45). Just as teachers strive to develop metacognition in their students, 'thinking about thinking' is a critically important process and ability teachers must develop in themselves.

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Reflection is a vital component of a teacher's professional development and Schon's influential book *The Reflective Practitioner: How Professionals Think in Action (1983)* facilitates discussion on this important topic. Reflecting on actual teaching and learning practice assists teachers in evaluating which elements of promoting thinking exist in their classrooms. This activity can lead to a better awareness of how to encourage higher levels of student thinking.

Many teachers might think they are promoting student thinking, but the reality may differ due to various reasons. The "espoused theory-of-action" and the "theory-in-use" developed by Argyris recognizes that what people say they do and what they actually do are frequently different (Argyris, 1991). When this dichotomy is illuminated, people are often embarrassed or defensive, therefore opportunities for professional development falter. Understanding this human tendency and exploring the role of each collaborative member can lead to powerful professional development opportunities.

The commitment of the teacher to promote student thinking is essential, yet "significant changes in the content and process of education require coordinated efforts throughout a school" (O'Neil, 1995, p. 21). A supportive network of colleagues and an encouraging environment greatly enhances the possibility of significant change as a result of professional development opportunities (Fullan, 2000). Building a community of professional support provides teachers with an opportunity to exchange ideas, reflect on their practice and offer encouragement in a constructive way to enhance teaching and learning (Clark, 1992; King & Newmann, 2000). Teachers can embark upon personal professional development as they continue down the path of a lifelong learner, whether they journey alone or with others (Pohl, 1997; Rasmussen, 1998).

Promoting student thinking demands innovation and time. If the efforts are to extend beyond the walls of one classroom, success will require "working simultaneously to create a totally different environment in the classroom, the school, in the school system and eventually in the community. And that is why it's not easy" (O'Neil, 1995, p. 21). Research projects such as Harvard Graduate School of Education's Teaching for Understanding Project and the PEEL project explore the link between teachers and facilitating higher levels of student thinking and teachers (Perkin & Blythe, 1994; Unger, 1994). The Teaching for Understanding Project developed a four-part framework involving generative topics, specific goals that support the primacy of

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teaching for understanding, activities contributing to this effort and authentic assessment. Researchers Perkins and Blythe (1994) believe the project has provided a "language and a philosophy" for teachers "who already do much, or even most, of what the framework advocates" (p. 4). Therefore, this project confirms the efforts of many teachers and "its banner is not 'completely new and wholly different' but a just-as-crucial 'more and better'" (Perkins & Blythe, 1994, p. 7).

The PEEL project grew from collaboration between a Baird, a researcher and Mitchell, an Australian high school science teacher. The project centered on a group of teachers discussing their efforts to improve the quality of their students' learning. The result of the teachers' efforts is an internationally recognized professional development program that focuses on teaching for understanding. A primary aim of this cognitive project is to foster students' independent learning by developing their metacognitive processes. Discussing the lack of funding given to the PEEL project, Baird and Northfield (1992) elaborate on the teachers' efforts and knowledge as valuable resources for improving student learning:

> One result of this lack of funding has been that all participants, and particularly teachers, have achieved their goals while carrying a full teaching and administrative load. This fact confirms our belief that, in teachers, there is an important resource for implementing substantive change to educational theory and classroom practice. A resource that is probably largely unrecognized...(p. ii)

SUMMARY

Promoting student thinking is a crucial area for development with "many countries now realizing that students need to become thinkers" (O'Hare, 2000, p. 6). The thinking movement is multi-faceted and has importance for the individual, society, democracy and the economy, yet it is not an element of all classrooms because this concept requires vision to put into a school-wide or national policy.

Promoting student thinking is necessary to prepare students for the decisions they will have to make, the problems they will have to solve and the learning they will have to undertake in a world that we cannot predict. In the wake of educational reforms prevalent in the 'information age', advances have moved the concept of the 'thinking classroom' from the theoretical to the practical. Attaining professional knowledge in

this critical area has empowered many teachers to deliberately and directly teach thinking skills in their classrooms in an effort to give their students the intellectual tools they will need in the future. Yet these skills taught in isolation are not enough. The promotion of student thinking occurs in classrooms that also sustain a climate of safety, use language to discuss their cognitive processes in an effort to become more metacognitive and encourage continuous interactions between students and between teachers and students to practice thinking.

Past New Zealand educational reforms reflect an economic rationalization for change, yet policies supporting this rationale can have modified interpretations. Absent from any national policies is a specific reference to promoting student thinking in the classroom and "it has been left to organisations like NZEI [New Zealand Educational Institute] to promote debate on such issues and individual schools to develop programmes which go beyond the prescribed curriculum" (O'Hare, 2000, p. 6). Thus, the issue of promoting student thinking in New Zealand schools remains disjointed, rather than nationally endorsed and actively supported.

As educators, promoting the concept of lifelong learning as stated in many schools' mission statements, involves embracing a more holistic approach to an individual's success and happiness in a social, emotional and professional sense (Fogarty, 2000; Tishman, Perkins, & Jay, 1995; Todd, 1993). 'Thinking experts' advocate facilitating higher levels of thinking skills in constructivist classrooms. The future world in which today's children of will live will change significantly from the world they now know, therefore it is not content knowledge that is important to instill in the young minds of students but rather the ability to continually learn.

> ...what we can - I say must - do is to give them the capacity and confidence to be tool-makers: to be able to fashion and refashion their tools for living and working as different challenges and opportunities emerge and change throughout their lives. (Claxton, 1997, p. 77)

Exploring thinking processes also allows for the inclusion of wider perspectives in today's multicultural societies. However, because the benefits are long-term, difficult to measure, and the professional development costs immediate, many schools are "organizationally and culturally antagonistic to thinking-centered learning" (Perkins, 1993/1994, p. 85).

The importance of a cognitive and metacognitive approach to teaching is paramount in education today and the individual teacher has the ability to affect change in the classroom, however small it may seem on the wider landscape. Though a government or school vision actively supporting the development of thinking classrooms would more easily facilitate this approach, professional development in the promotion of student thinking can incorporate insights from New Zealand teachers, for New Zealand teachers.

Chapter 3

The Research Process

JUSTIFICATION OF RESEARCH DESIGN

Qualitative versus Quantitative

In research, two approaches of design exist: qualitative and quantitative. Qualitative research in education is sometimes referred to as "*naturalistic* because the researcher frequents the places where the events he or she is interested in naturally occur" (Bogdan & Bilken, 1992, p. 3, italic emphasis in original quote). Qualitative research focuses on "how all the parts work together to form a whole" whereas the quantitative approach examines the parts or variables through experiments to better understand the issue (Merriam, 1998, p. 6). This research relies upon a qualitative framework because the researcher wanted to gain insight into the perspectives, backgrounds and teaching methods of primary teachers who were consciously promoting student thinking.

The quantitative approach, sometimes referred to as the scientific approach, is most often used in the field of science where variables are controlled and a general theory is investigated. This theory determines which aspects to observe, then patterns emerge and 'knowledge' is determined. However, the role of the person conducting this research is becoming increasingly recognized as having an impact upon the 'knowledge' that is determined. By adopting the positivist viewpoint of observing the facts of nature objectively, the creative ideas, analysis, speculation and experimentation utilized by scientists trying to make better sense of the world are reduced to a process of indifferently following a formula. While the quantitative methodology continues to grapple with the affects of the researcher, it has become more evident in the last few decades that this may not be the most suitable methodology to use exclusively when exploring the multi-faceted nature of people. Therefore, methods other than, or in addition to, quantitative approaches have become more accepted in investigations, especially in educational research, as this focuses primarily on humans with all their complexities.

The researcher's constructivist theoretical perspective structured the research design by influencing the selection of a qualitative approach. The choice of methodology depends upon the philosophy and epistemology of the researcher. This method was chosen because it allowed for the constructivist philosophy inquiry aim of developing a clear *understanding* of the topic. Quantitative approaches seek *explanations* as aims of inquiry. Many researchers decide on incorporating elements of both qualitative and quantitative approaches into their investigations when appropriate (Burns, 1998). The decision to conduct research in the form of a qualitative case study rather than using quantitative research methods or a combination of the two methodologies "stems from the fact that this design is chosen precisely because researchers are interested in insight, discovery, and interpretation rather than hypothesis testing" (Merriam, 1998, pp. 28-29).

The tenets of a constructivist philosophy were demonstrated by providing a platform for the importance placed on individuals' meanings, the creation of shared understandings, and the necessity of the investigation occurring in the natural setting of the primary school classroom (Denzin & Lincoln, 2000). Control of the inquiry was shared between the researcher and the participants. The voices of the participants and the researcher resonate in the research (Lincoln & Guba, 2000). The constructivist philosophy values the process of revelations aligning with the emphasis on the process of learning found in the movement to promote student thinking.

Because of the lack of research related to the phenomenon of the teachers' roles in teaching thinking in New Zealand primary schools, the researcher sought an understanding of the current situation through the constructivist approach. However, the researcher is not a constructivist purist and recognizes the benefits of incorporating philosophies such as critical theory and participatory inquiry to examine the historical and social implications for teaching thinking and call for action. Lincoln and Guba (2000) cautiously agree it is possible to blend elements of commensurable philosophies.

The researcher planned to work in the field in order to gather information that utilized three sources: self-assessments, observations, and interviews. It was the data from the participants that would aid the investigation of the research aims rather than the hypotheses of the researcher. In contrast, a quantitative approach begins with a theory

and the investigation determines the validity of that theory. Therefore, all four characteristics Merriam (1998) describes as foundations of qualitative research, existed in this research: understanding the phenomenon from the participant's perspective, not the researcher's; the researcher as the primary instrument for data collection and analysis; fieldwork; and an inductive research strategy (pp. 6-7).

There is also a strong emphasis on reflexivity in qualitative research (Delamont, 1992). Reflexivity refers to the recognition that the researcher cannot base herself outside the social world, a self-awareness related to human interactions. Reflexivity then becomes a necessary part of qualitative research in order to understand the effects of the researcher on all aspects of the research, from the design to the report writing. This occurs especially in the data gathering phase which relies on the interactions of human beings (Delamont, 1992). This researcher has attempted to explicitly state all the processes involved in the investigation, including her constructivist philosophy as a theoretical bias underpinning this research.

Case Study

A case study, prevalent throughout the field of education, is the most appropriate design for this investigation because it is "both a process of inquiry about the case and the product of that inquiry" (Stake, 2000, p. 436). An important strength of the case study is that it allows the researcher to focus on a specific situation and identify the various processes and features interacting within that situation (Bell, 1993; Burns, 1998). The *significance* of particular conditions rather than the frequency of their occurrence are paramount in case studies (Cohen, Manion, & Morrison, 2000). Therefore, choosing a case study comprised an "all-encompassing method" to intentionally "cover contextual conditions" (Yin, 1994, p. 13).

Because this research aims to offer insights specific to the teaching situation in New Zealand, the justification of choosing this design is valid because:

> an important criterion for judging the merit of a case study is the extent to which the details are sufficient and appropriate for a teacher working in a similar situation to relate his decision making to that described in the case study. The relatability of a case study is more important that its generalisability (Bassey, 1981, p. 85 cited in Bell, 1993, p. 9).

It is important for the readers to establish correlations between the teaching and learning examples identified in this research and their own experiences in order to reflect on approaches to teaching thinking from teachers facing similar loads and responsibilities. By examining the personal views and circumstances of the research participants, a key trait of case studies, the reader may find conditions and attitudes with which s/he can associate (Stake, 2000).

Participants possessing varying degrees of teaching experience and working within diverse school environments were purposefully selected. It was never the intention of the researcher to label these participants as 'typical' or 'representative' of teachers with similar backgrounds; rather the selection was deliberate by the researcher so that variety was built in, increasing the possibility of *relatability* by the readers.

This case study was an *instrumental* case study because of its aims at providing insight into a particular issue: the promotion of student thinking in middle and upper primary school classrooms (Stake, 2000). Therefore it is not the particular case that is of interest, but the role it plays in developing an understanding of teaching thinking. The particular case certainly informed the other interest and the proper steps in conducting case study research were followed, but it was the combination of the specific case and the understanding it brought to the teaching of thinking that denoted this as an instrumental case study (Stake, 2000). Case studies have the potential to influence practice and policy (Merriam, 2000), therefore selecting a qualitative instrumental case study methodology proved appropriate because one aim of this research was to contribute to teaching practice in the realm of thinking skills.

Reliability and Validity

Within any qualitative and quantitative research, the important factors of reliability and validity must be addressed. Because of the differing philosophical underpinnings of these two forms of research, the complex terms of validity and reliability must be defined specifically within each approach. Many writers on this topic advocate a different understanding of each term based upon the paradigm, some suggest renaming the concepts, and some even maintain that the constructs of validity and reliability have no place at all in qualitative research (Merriam, 1998).

Reliability in quantitative research involves the ability to replicate the experiment and produce the same results consistently. When investigating within the qualitative paradigm, the inability to replicate the situation is viewed as a strength not a weakness because of the uniqueness of the phenomena being researched (Burns, 1998). Human behavior is dynamic, ever-changing and difficult to replicate. Therefore, reliability in qualitative research embodies a different conceptualization. Because qualitative researchers are interested in the "degree of accuracy and comprehensiveness of their data," Bogdan and Bilken (1992) have articulated the definition of reliability within this paradigm as "the fit between what researchers record as data and what actually occurs in the setting under study" (p. 48).

Validity, like reliability, is defined differently in qualitative and quantitative research. From a quantitative perspective, validity involves accuracy, ensuring that a particular instrument actually does correctly measure what it claims to measure (Cohen et al., 2000). Qualitative researchers define validity as 'authenticity' (Guba & Lincoln, 1989 cited in Cohen et al., 2000), 'understanding' (Maxwell, 1992 cited in Cohen et al., 2000; Mishler, 1990 cited in Cohen et al., 2000), or a 'confidence' in the results (Hammersley, 1992 cited in Cohen et al., 2000) rather than the certainty that is vital to the quantitative framework.

Within the realm of validity exist two elements: external and internal validity. External validity in quantitative research refers to the ability to generalize the results to other cases. This directly contradicts the aim of many qualitative research projects, which are to investigate particular cases or situations in depth. However, rich descriptions can provide enough information for the reader to determine how the perspectives in the study relate to the reader's own situation, and the use of several sites or cases allows for a broader range of relatable situations (Merriam, 1998). This approach is a core element of this research.

The question of external validity is irrelevant if the requirements of internal validity have not been met. Internal validity investigates whether the research findings accurately represent the actual conditions. For a qualitative study to be valid, researchers should be mindful of three conditions: plausibility and credibility, the kinds and amounts of evidence required, and the clarity of the kinds of claim made from the research (Hammersley, 1992 cited in Cohen et al., 2000, p. 108).

Triangulation

Triangulation of data sources strengthened the validity or credibility of this case study by providing confidence in the results. The notion of triangulation encompasses "the use of two or more methods of data collection in the study of some aspect of human behaviour" (Burns, 2000, p. 324). Relying on only one method of data gathering can bias or distort the researcher's interpretation of the situation. However, the researcher can have more confidence in the data if similar information emerges from varying methods of collection. Triangulation purports that if different methods of assessment or investigation produce the same information then the data is likely to be valid (Burns, 2000). Data from the self-assessment scales, observations, and interviews was triangulated in this investigation.

Coding

Data from a range of methods such as observations, interviews, self-assessments, and field notes were collected and systematically coded by using open, axial, and selective codings in accordance with grounded theory research that begins with open-ended questions and not the hypotheses evident in quantitative research (Glaser & Strauss, 1967). Though the research is underpinned with a constructivist philosophy, elements of the grounded theory approach were 'borrowed'. This is acceptable in accordance to Denzin's and Lincoln's (2000) agreement that research boundaries do sometimes blur. Grounded theory research relies on an inductive approach to investigation rather than a deductive one, thereby allowing categories, themes, and hypotheses to be constructed from the data (Bogdan & Biklen 1992; Delamont, 1992; Glaser, 1978). The researcher collected and studied all the data, meeting Glaser and Strauss' requirement of deep involvement to gain insight for the analysis.

Coding is part of the content analysis that illuminates the beliefs, attitudes and motives of the participants (Burns, 2000). Carefully and logically analyzing various forms of information gathering is imperative to the validity of quantitative research and recognized as an integral part of triangulation. Analysis was conducted using the constant comparative format whereby data are code into categories, then compared with other data, followed by a merging of codes and data. This comparative process continues until, in a sense, the 'answers' to research questions have been derived

(Merriam, 1998). Data are directly used to construct the maximum number of descriptive categories and the circumstances related to each category.

From the coding in this research, six prominent themes emerged from the observations in Phase Two. During Phase Three's interviews, a holistic approach to teaching was described by all teachers. They expressed a range of formative influences on their promotion of student thinking in addition to describing various types of thinking consciously being fostered. Six themes were coded in relation to the teacher's role in the thinking environment. An overall examination of the themes evident in the three data sources revealed five key factors: listening, sharing and challenging each others' ideas; questioning; the use of specific terminology; reflection; and students taking an active role in their own learning. These codes will be examined in more detail in Chapter 4's results and Chapter 5's discussion.

METHODOLOGY

Introduction

As stated previously, the methodology used in this research emerged from the researcher's constructivist philosophy. The methodology facilitated the acquisition of data that was accumulated in the investigation of three research questions:

<u>Research Questions</u>

1. Why do teachers believe that promoting student thinking is important?

2. How are teachers in New Zealand middle and upper primary schools consciously promoting higher levels of student thinking?

3. How have teachers interested in promoting student thinking developed their professional knowledge in this area?

Permission to commence this research was granted by the Massey University College of Education Ethics Committee after documenting the justification, objectives, and ethical considerations, as well as any legal issues or cultural concerns related to the investigation. In this investigation gender and ethnic factors were not addressed because of the small sample of participants. The researcher recognizes that the ability

to think does not exist free of cultural and contextual influences and supports the inclusion and appreciation of wider perspectives evident in the 'thinking movement'.

To acquire a pool of interested participants, a self-assessment attitude scale related to the promotion of thinking skills in the classroom was mailed to fifty-six schools of varying socio-economic levels in the Auckland area (Appendix A). The scales were distributed in information packets sent to public and private primary schools that had expressed an evident interest in promoting student thinking by partaking in various seminars and/or Ministry of Education contracts. By targeting the selection of teachers based upon their interest in promoting student thinking, the researcher recognizes that the participant sample is positively biased. This bias is necessary to fulfill the research aim of investigating the teaching practices and learning environments of teachers interested in promoting student thinking.

If participation was approved by the principal and Board of Trustees, teachers were given the self-assessment scales to fill in. Interested teachers then rated themselves in consideration of the eighteen statements and returned the self-assessments individually to the researcher in self-addressed, stamped envelopes to ensure confidentiality. After receiving the self-assessments, a group of teachers was invited to continue into Phase Two: Observations and Phase Three: Interviews. Within these phases, the researcher and educators communicated directly with each other rather than through the principal.

From the responses, six teachers in four schools were selected with the teachers representing the male and female genders as well as having years of teaching experience and relative inexperience. The selection provided the researcher with a range of learning environments to investigate and a variety of teacher profiles. The six participants were professional, courteous, and committed throughout the research.

In the next phase, the chosen educators selected a lesson for the researcher to observe with the criterion requiring that the lesson demonstrate the promotion of student thinking rather than a subject specific area. Promoting student thinking through a range of subjects was demonstrated including reading, writing, oral language, te Reo Maori and Tikanga, social studies, and health. The variety of topics thus reinforced the premise that thinking skills are embedded in and can be enhanced in all curriculum areas. Lessons were videotaped after obtaining consent from the students and

parents/guardians. In the following days, an interview conducted between the researcher and the teacher provided further insight into the teacher's beliefs and teaching program. The classroom lessons ranged between thirty minutes to one hour and the interviews between the teacher and the researcher were approximately one hour. The videotaped lessons and the audiotaped interviews were conducted within the school setting in order to see the teacher in the 'natural' thinking environment and in consideration of convenience for the teachers.

Information Packets

The selection of schools was established on the basis of schools that had an expressed an interest in the importance of promoting student thinking in the primary classroom. A myriad of factors informed the determination of this interest. The factors were: schools that sent delegates to the Ninth International Thinking Conference held in Auckland in January 2001; schools with teachers who had attended professional development workshops relevant to thinking skills at local educational centers such as Kohia Teachers Centre, North Shore Education Centre, and West Auckland Education Centre; schools participating in related Ministry of Education contracts, such as Curriculum Integration, Gifted and Talented Enrichment, the Early Numeracy Project (ENP), and the Advanced Numeracy Project (ANP). These factors were thought to encourage student thinking because of the directed focus on the teacher's role in creating a culture of thinking.

Fifty-six primary schools in the Auckland area were chosen to create a pool of potential participants and they received information packets related to this research. In addition, the researcher emailed the Ministry of Education and requested a list of primary schools in the Auckland area. The researcher promptly received a document containing contact information, with such items as street and email addresses, phone numbers and names of the school principals.

Each of the fifty-six schools received an information packet containing:

- a letter to the principal
- five information sheets for the teachers
- five 'thinking' self-assessment scales for teachers (Phase One)

- five stamped envelopes addressed to the researcher
- an information sheet for the teachers involved in the videotaping of their lesson (Phase Two) and an audiotape interview (Phase Three)
- an information sheet for the parents
- an information sheet for the students
- a combined consent form for the students and parents
- a consent form for the teacher

Refer to the Appendices, items A-H, for samples of the items distributed in the information packets.

The letter to the principal introduced the researcher and explained the proposed participation of staff from his/her school. Timelines and ethical considerations such as confidentiality, consent and the rights of the participants were some of the issues addressed in the letter. Copies of all correspondence that would be sent to the participating school community if the school elected to partake in this research were included. The researcher requested that the teacher information sheets and self-assessments be distributed to staff members if approval was granted. If any questions related to the research existed, the researcher requested that a meeting with the principal and/or Board of Trustees be scheduled. The researcher informed the principal that if more than five staff members were interested in participating in this research, the self-assessments could be photocopied or the researcher could send more to the school with the corresponding stamped, self-addressed envelopes. Considering the contents of the information packets and the number of packets distributed, at this stage potentially 280 teachers could partake in Phase One of the proposed research.

Responses

After the initial mailings, one school indicated it would participate in the research and twelve principals declined the invitation to be involved via a letter or fax. In their responses, many principals made comments regarding the return of the stamped envelopes that were attached to the teacher's self-assessment scales. While the initial response rate was 23%, the researcher feels the rate of response might have been even lower if the stamped envelopes had not been included in the information packets. Forty-three schools did not respond.

Of the remaining forty-three schools, twenty-eight were contacted a second time via a follow-up email. Those who did not have email addresses on file with the Ministry of Education were called. In some cases, contact was directly made with principal, in other cases messages were left with secretaries or on answering machines. Four schools were called but a second contact with them was never made.

From the second contact through emails and phone calls, five schools indicated they would like to participate, five more schools asked that the information packets be re-sent, and one school requested that the researcher meet with the Chairperson of the Board before approval to participate could be granted. At the conclusion of the meeting between the researcher and chairperson, approval was given and this school participated fully in all stages of the research. Eight more schools declined and twenty-four schools never responded.

In summary, the researcher received a positive or negative response from 57% of the schools contacted, though many were contacted twice. No reply was given by 43% of the schools. In total, seven schools in the Auckland area agreed to participate.

Table 1: Response rate from schools

School Response Rate	
Initial contact	23%
Second contact	34%
No response	43%

Many of the schools that declined to participate cited reasons such as a commitment to other research projects, involvement in school productions, staff turnover or illness, and a reluctance to ask busy teachers to take on more work.

> "Your research is the most interesting topic we have seen this year but unfortunately we are already committed to other research projects" (Decile 10 school).

"Unfortunately, the school has been 'researched to the hilt' and at this time we are unable to assist you" (Decile 3 school).

Several schools indicated an interest in the topic, yet declined participation.

"Thank you for the well organised and prepared research information. We, at, [school's name] are very interested in the topic of your research. Unfortunately, the staff, while interested, feels concerned that they could not do justice to your research because of the time required. We wish you every success and look forward to the reading of your results" (Decile 10 school).

"Your research sounds very interesting...I hope you get some good responses" (Decile 7 school).

"Our school will be focusing on thinking skills next year and we are very interested in your topic. However we will not be able to participate due to an upcoming school production and [because of community pressure documented in the media]" (Decile 10 school).

However, one principal emphatically stated over the telephone that his school would be very interested in participating in any research focusing on the promotion of thinking skills and he invited the researcher to participate in a 'thinking' seminar that he was involved in organizing. His school participated fully in all phases of the research.

Participants

From the seven schools that agreed to participate, five were chosen to continue into Phase Two and Phase Three of this research. After reviewing their self-assessments, eight teachers who represented a range of experience, gender and school communities were given information sheets and consent forms related to Phase Two, the videotaped observations of classroom lessons. At this stage, five female and three male teachers representing a range of teaching experience between one and eighteen years and working in schools with deciles of three to ten comprised the participant pool.

Videotaping appointments were scheduled with two teachers at one particular school but they later withdrew, independently of each other, citing an overload in their work schedules as the reason. The withdrawal of these two male teachers from a decile three school shifted the participant group so that it consisted of five females and only one

male working in schools with deciles of four to ten. The range of experience was not affected by the teachers' withdrawals.

The participants in this study were six professional educators who worked in the middle and upper sectors of primary schools. It was intended that the original scope of the year levels should represent only Year 4-6 classes; however, two of the teachers who returned self-assessment scales to the researcher taught in Years 3 and 4 composite classrooms. Year 3 is situated in the middle sector of primary schools therefore considering the participation of teachers from Year 3/4 composite classes did not affect the aims of the research. In view of this factor and in evaluating the self-assessment scale responses, these two teachers were invited to participate in Phase Two of the research. Thus, the final selection of research participants included teachers working with children whose ages ranged from seven to eleven in Year 3-6 classrooms. The teachers worked within Auckland schools that had decile ratings spanning between four and ten. The decile rating is a national scale that ranks schools in relation to the social and economic status of the surrounding community, with ten representing the highest socio-economic area and one indicating the lowest.

The educational background of the participants varied from diplomas of teaching to university degrees. One teacher had begun a Master's degree while another was trained overseas, and still another teacher had earned a diploma of teaching extramurally. Two of the participants taught in Year 3/4 classes with one of the classes operating as an identified Gifted and Talented class. One educator worked with a Year 4 class, another in a Year 4/5, one in a Year 5 and lastly, one participant taught in a Year 5/6 class.

ETHICAL CONSIDERATIONS

To ensure all ethical issues related to the protection of the research particpants were considered, the researcher sought and received permission to conduct the investigation from Massey University. Before distributing any information in relation to the research, permission was applied for and granted by the Massey University College of Education Ethics Committee. In order to protect the identities of the relatively small sample of participants, the researcher has not included full transcriptions of the observations and interviews in the appendices because the participants could be easily

identified. Observation and interview excerpts are included as samples. Full transcriptions are available to the examiners at their request.

Informed Consent

Teachers were informed that responding to the self-assessment statements and returning them to the researcher implied consent for Phase One of the study. If the teachers were selected to participate in Phase Two and Three of the research, their informed consent would be sought separately. The higher degree of participation involved with Phase Two and Three compared with filling in a self-assessment demanded that in order to protect the rights of the participants, they separately consider their decision to continue with this investigation.

Upon returning the self-assessment scales to the researcher, participants received an envelope containing: the appropriate number of student information sheets, parent information sheets, student/parent consent sheets, a teacher consent for videotaping and audiotaping, and a stamped enveloped addressed to the researcher. Teachers were asked to distribute the information sheets and consent forms to their students after discussing the research with their classes. After receiving the consent forms, participating teachers recorded the students with and without consent against a class list, returning the student forms as well as the teacher's consent form in the envelope provided. The researcher also recorded which students had permission and those who did not to ensure that the rights of all children in the classroom were respected. In some cases, emails, telephone calls, or faxes were utilized to check on the status of the consent forms. When the consent forms were received the researcher called the teachers to schedule an observation time and answer any questions the teachers might have.

Rights

The teachers, students and caregivers were informed of their right to withdraw from the research at any point. Each participant was given a full explanation of the intent of the research and their contributing role.

Confidentiality

The use of pseudonyms throughout the research, protected the confidentiality of all participants. Pseudonyms were given to teachers and any children who made comments or whose names were mentioned on the video and/or audiotape recordings. All people who participated in this research were notified that guarantees about maintaining absolute confidentiality could not be made but that every conceivable effort would be carried out to protect their identity.

The researcher transcribed all classroom observation video recordings and the audiotapes from the focused interview with the teachers. No assistance from other people was given in the transcriptions of these recordings. Transcriptions were sent to the teachers to ensure accuracy and allow for any further reflection.

Potential Harm to Participants

'Regular' classroom lessons were recorded during the data collection phase. By asking the teacher to teach 'normal' lessons that they believed promoted student thinking, the learning environment of the students was not affected. The teachers believed they were already promoting cognition in varying degrees in their practice, therefore the routines of the schools, teachers and students remained the same during the observations, thereby reducing any disruptions to student learning. As it was acceptable but unnecessary for the whole class to participate in the lesson, students who did not agree to participate in the research worked either at activities within the classroom, outside the recording range, or in groups outside the classroom, such as drama or art groups. The alternative small group work for non-participating students was decided by the teacher in order to best accommodate the learning needs of those students. The children who elected not to participate were in no way disadvantaged because most primary classrooms have small group activities throughout the day. Consequently, the rights of ALL students were accommodated while still meeting the needs of the research.

Benefits

The potential benefits of this research to participants, the New Zealand primary school system and the field of knowledge related to teaching thinking were:

- participating teachers were given a formal opportunity to be reflective practitioners

- specific ideas and strategies used in the New Zealand primary school system could be identified, analyzed and reported.

- the possibility for enhancing the field of knowledge in this area as little research into the promotion of student thinking has been done, specifically relating to middle and upper classrooms in New Zealand.

FIELD WORK

Phase One: Self-Assessments

The initial step began by locating a self-assessment tool on the promotion of student thinking. A scale designed and tested by John O'Brien, a recognized Australian researcher investigating thinking skills in education was located. O'Brien's research includes an investigation of deBono's CoRT direct thinking skills program into high schools (O'Brien, Stapeldon, Edwards, & Diamond, 1994 cited in O'Brien, 2001). O'Brien presented his scale, "Promoting Thinking in Classroom Learning – A Self-Assessment Scale for Teachers," at the Ninth International Conference on Thinking held in Auckland, 2001 (Appendix A). This five-point scale measures attitudes on a very often (vo), often (o), sometimes (st), seldom (sd), and never (n) continuum modeled on the Likert method, which is believed to be reasonably valid and reliable (Burns, 1997). Other scales were available to measure general classroom thinking, however the scale created by O'Brien was intentionally devised to "indicate the degree to which teachers encourage thinking in student classroom learning" and "to generate personal first hand data about their teaching for thinking in the classroom" (O'Brien, 2001, p. 3). A primary aim of this research involved an investigation of the teaching practices and environments of teachers interested in promoting student thinking, therefore justifying the use of O'Brien's scale.

The purpose of using the self-assessment attitude scales was to gather participants' viewpoints about their promotion of student thinking. By combining this tool with comments made in the subsequent focused interview, a profile was developed of their beliefs and actions when teaching for thinking. Analyzing their self-perceptions in relation to their actual practice provided a platform on which to evaluate what Argyris (1991) refers to as their espoused theory-of-action with their theory-in-use.

Responses from the self-assessment scales on the promotion of student thinking were also analyzed to see if certain questions resulted in similar responses from the teachers. Statements that produced similarities are discussed in the results and represented in Figures 1 and 2 in Chapter 4. Figure 1 depicts the statements that had little variation in their responses and Figure 2 depicts statements with the widest range of variation. The researcher in no way recognizes this as significant statistical data because of the small scale of this study.

Phase Two – Observations

Observation is an important tool of research. Before an observation commences it is crucial to determine what to observe, how to observe, and how to record the observation. When deciding what to observe, the aims of the research are paramount. A myriad of elements exist in every setting and it is impossible to observe them all. Merriam (1998) refers to lists that several writers have created to guide observations. Included but not limited to her list are: the physical setting, the participants, activities and interactions, conversation, the observer's behavior, and subtle factors such as nonverbal communication, symbolic meanings in words, and what is *not* happening (Merriam, 1998, pp. 97-98). The activities, interactions, and conversations of the participants were the three primary foci of the research with consideration given to the effects of the researcher on these observations.

Multiple methods for conducting observations and varying degrees of participation exist within the two primary types of observation found in this field of research: participant and non-participant. Determining the type of observation that will take place during qualitative research depends upon which method is most suitable for the particular study. Participant observation involves the researcher taking a role within the focus group being investigated. Often this occurs without the awareness of other members. It can also take place in a situation where the participants are informed of the research and furthermore, when the researcher is involved also as a participant. Non-participant observation denotes an effort by the researcher to exclude him/herself from becoming directly involved with the group or activity being studied. In non-participant research, the observer can be completely hidden from the group, as in a situation where a one-way mirror or hidden camera is used, however few schools have the facilities to provide complete non-participant research. Therefore the researcher

became a non-participant observer whereby the classes were aware that they were being observed but contact with the researcher/observer was limited (Burns, 1998; Cohen et al., 2000; Merriam, 1998). During the course of some observations, the researcher/observer was invited to participate by members of the group, however verbal contact between the researcher/observer and the students was minimized in an effort to focus on the teachers' interactions with the students.

Consideration was given to the effects of being observed, as this can sometimes change participant behavior (Merriam, 1998). Knowing this, the researcher took steps to reduce the affects on the teachers and the students. Each teacher selected a lesson for observation that s/he thought represented the promotion of student thinking in the classroom. The implications of allowing the participant to choose the lesson were two-fold. The teacher was more at ease because the thinking lesson could be in a subject area within which s/he was more at comfortable. In addition, the participant choice provided another opportunity for the researcher to determine how the teacher interpreted the promotion of student thinking in his/her practice.

The teaching participants and the researcher engaged in activities aimed at minimizing the affects of the observation relative to the students' participation. Prior to the observation, teachers discussed the research openly with their classes and without the presence of the researcher. Consent forms and information letters for the students and separate letters for the parents were distributed. The creation of separate information letters for parents and students enabled the researcher to describe the investigation process in a language that was more suitable for the children. Consent forms for the parents/caregivers and child accompanied the letters and provided a further to discuss any concerns at home. The teachers also received consent forms and information sheets specifically written for their involvement.

Before the observations began, the children were introduced to the researcher. The researcher explained her purpose for videotaping and reiterated confidentiality issues. Before taping began the students were provided with an opportunity to ask any questions in an effort to clarify their role in this research, dispel any anxiety and facilitate more 'natural' behavior in front of the camera. When filming, the researcher used a video camera with a side screen to prevent her from being 'hidden' behind the recording device. This allowed the children and teachers to see the researcher's face

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and make eye contact, facilitating a less intrusive role for the researcher and minimizing the affects of her presence. Students who did not have consent were identified and were not recorded. They either participated in an activity outside the classroom or outside the range of the video camera.

Lessons varied in length but were generally fifty minutes. The observations were recorded on videotape and transcribed by the researcher, therefore the observations did not completely rely on the memory of the observer (refer to Appendix J for an extract from an observation). Through the moving images, the researcher was able to document the tone of the classroom, non-verbal expressions, displays and written work, as well the language of the teacher and students. These images provided an interesting source of information used in conjunction with the self-assessments and focused interviews.

Locating the observations in the natural settings of the schools was crucial because of the contextual emphasis in qualitative research whereby removing "the act, word, or gesture from its context is, for the qualitative researcher, to lose sight of significance" (Bogdan & Biklen, 1992, p. 30). For this reason, the interviews conducted in Phase Three of this research occurred in the school setting also.

Phase Three – Interviews

The qualitative paradigm of research recognizes the value of language and stresses the importance of interviews, both structured and unstructured when gathering data to construct meaning. It is through the discourse of the participants that meaning is constructed (Gee, 1999). An interview allows the participants to interpret their lives and activities however, it is imperative that other sources of information are used to confirm or refute this evidence (Burns, 1998). This constructivist approach emphasizes an importance on interpretation and the existence of multiple realities (Cresswell, 1994). In contrast, the quantitative paradigm of research "fails to take account of people's unique ability to interpret their experiences, construct their own meanings and act on these" (Burns, 1998, p. 10).

Focused Interviews

The interview method employed in this research was the focused interview. The focused interviews were conducted individually with each participating teacher at his/her school. The duration of each interview was about one hour with open-ended questions and a tone of ease, comfort and conversation (Burns, 1998). In the individual focused interview, each teacher was asked the same questions but the interviewer probed for depth or clarification (refer to Appendix K for the focused interview questions). Asking open-ended questions allowed for a range of responses reflecting the perspectives of the teachers. These answers were compared with the responses on their self-assessments. By asking the participants the same questions, it was the intent of the researcher to increase the comparability of the results and the data was more easily organized and analyzed (Cohen et al., 2000).

A few days prior to the interview, participants received a list of questions they would be asked, giving them time to reflect on possible responses. Some teachers made notes about particular questions and referred to them during the interview. All interviews were audiotaped and conducted at the teacher's school, with five of the six interviews taking place after school in the teacher's classroom. One interview occurred in the teacher's release time during normal school hours and was held in the staff room. The researcher transcribed each interview and the teaching participants were given the opportunity to comment on the transcriptions (refer to Appendix L for an extract from a teacher interview).

Chapter 4

Results

Data discussed in this research were drawn from an instrumental case study. Appendix M details the dates and time of the data gathering phases. Initially several codes emerged from the varied information gathering sources. The codes were merged to form the themes that are outlined in this chapter. After constructing a 'profile' of each teacher, each source of data: self-assessments, observations and interviews, is examined and triangulated. In Chapter 5, these results are discussed.

The purpose of this study was to describe how New Zealand middle and upper primary school teachers are consciously promoting student thinking. The research was conducted in Auckland, a large, multicultural city and all classes reflected this diversity. Given the small sample of participants and the scarcity of literature related to gender or ethnic influences in the promotion of student thinking, these factors were not incorporated into the parameters of this research. The researcher values the unique cognitive contributions from people of each gender and varied ethnicities and suggests that future research could specifically incorporate these elements and contribute to the field of knowledge.

Profiles of the teachers are described in an effort to increase the *relatibility* for the readers. The teachers' levels of experience, school deciles, age groups taught, reasons for an interest in promoting student thinking and perceived school support are highlighted. These aspects are detailed and correlated to a description of the observed lesson and any significant factors related to the self-assessments or focused interviews.

PROFILES OF THE TEACHERS

Teacher A

Teacher A worked in the same decile 10 school as Teacher D, teaching in a Year 5/6 classroom. The Auckland primary school was recognized in the educational community as having a strong information technologies focus. In total, Teacher A had

eighteen years of teaching experience, in between which there was a fifteen-year absence because of a decision to stay at home and focus on family. Consciously promoting student thinking first began out of a personal interest but Teacher A indicated that s/he worked in a school environment that was also very supportive of this notion.

For the observation, Teacher A selected a cooperative group activity related to the oral language strand of the English curriculum. The students worked in established groups of 4-5 children that were organized by the teacher at the beginning of the year. Teacher A formed these groups based upon information received from sociograms the children created. In the observed activity, one child shared or 'reported' on a current event and the other children recorded the information. The position of reporter rotated on a pre-determined schedule and the teacher moved between the groups as they completed this activity.

The students asked questions of the reporter to ensure that all items of the 5w's/1h or de Bono's Six Thinking Hats frameworks had been covered. The 5w's/1h framework structured the current event reporting by requiring the who, what, where, when, why and how of the news item were explained. De Bono's Six Thinking Hats program (1992) involves a separate identification of various elements of thinking. The purpose of the black hat is to determine what is 'wrong' with an issue by finding weaknesses, making assessments and critically thinking. The yellow hat represents the benefits of an issue and the white hat relates to the facts and a determination of the types and sources of information. The purpose of the green hat is to allow for creative thinking by generating new ideas, alternatives and possibilities. The red hat involves making personal feelings known and recognizing the role of feelings when making choices and assessments. The last hat is the blue hat, sometimes referred to as the metacognitive hat, with the purpose of defining a problem, planning an action, redefining the issue to determine the next step and summarizing.

The children were first introduced to the 5w's/1h framework at the beginning of the year followed by an investigation of the Six Thinking Hats as a tool for reporting comprehensively on a current event. The students were required to utilize these frameworks as platforms for organizing their information. After using each framework once, the children independently chose one of the two options for their subsequent

turns at reporting. Therefore, during the observation the use of both frameworks was evident.

On the self-assessment statements about promoting student thinking, Teacher A marked only the *very often* and *often* responses to the statements. During the interview all questions were answered without hesitation. In a response to some questions Teacher A elaborated on upcoming questions. In these events, the researcher refrained from asking the questions that had already been answered. Similar situations arose in other interviews and this same practice was followed throughout all of the interviews. Teacher A shared many personal vignettes and an obvious passion for the topic, revealing a certainty in being selected for this study and remarking, "it's been a really good experience".

Teacher B

Teacher B had been teaching throughout new entrant and high school classrooms during eighteen years of experience. At the time of the data gathering phase of this research Teacher B was teaching a Year 3/4 Gifted and Talented Education (GATE) class in a decile 4 school. The decision to consciously promote student thinking grew out of a personal interest related to Teacher B's children's education. Working in the same school as Teacher F, Teacher B professed a semi-supportive school ethos of promoting student thinking; neither Teacher B nor F revealed a strong sense of school support in their self-assessments and interviews. The school was involved in several Ministry of Education contracts and there were three designated GATE classes. On every self-assessment statement Teacher B responded *very often* or *often* except in relation to question 12: *I discuss with my colleagues how to challenge students to use higher order thinking skills (e.g. analysis and synthesis).* Teacher B came to the interview prepared with some written responses to the questions. Like Teacher A, Teacher B expressed a passion about the topic concluding the interview with the comment, "I think any initiation to increase the teaching of thinking is really good and should be encouraged".

Teacher B selected a cinquain poetry lesson related to the written language strand of the English curriculum for the observation. The lesson built on a volcano brainstorm the children had completed earlier related to their topic for the term, disasters. The

school was part of the Ministry of Education's Integrated Curriculum contract and this lesson did not remain solely focused on the poetry but evolved to include facets of science and social studies. The children examined the elements of a cinquain to determine its structure. A discussion about the meanings and differences between similes and metaphors ensued providing images for the fourth line of a cinquain which requires four words. The teacher then asked the children to organize the words from their brainstorms into columns labeled adjectives, verbs ending in 'ing', four-word phrases, and synonyms to facilitate the ease of the poetry writing. Pictures of various types of volcanoes were presented to assist the children in creating more words and images than those already brainstormed. Teacher B worked with some children individually after the whole class instruction, as they sorted and classified their words and phrases. The actual writing of the cinquains occurred in a following lesson.

Teacher C

Teaching a Year 4/5 class in a decile 7 school, Teacher C was a first-year teacher in the primary school system but had previously worked in vocational training for adults and young adults. Teacher C commented on "surviving" the first year of teaching and was very pleased to have a supportive tutor teacher. Indicating in the interview that the school encouraged the promotion of student thinking, Teacher C, however, responded *sometimes* to statement 12 on the self-assessment: *I discuss with my colleagues how to challenge students to use higher order thinking skills (e.g. analysis & synthesis).*

Teacher C had very definite views about the holistic importance of education but marked *seldom* on statement 11: *I make time to think deeply about my teaching.* The remainder of Teacher C's responses varied between *very often, often* and *sometimes*. Teacher C concluded the interview by reiterating a holistic view of the importance of promoting student thinking:

> For me the issue of thinking is really important, especially in non-traditional curriculum areas...they need those thinking skills when I'm not there. An issue with maths isn't going to, on a weekend, isn't going to be as much of an issue for thinking as an issue with peer pressure, "What do I do?," an issue with bullying, "How do I deal with this?" Thinking in terms of social skills and social settings is more important.

The focus for Teacher C's lesson was a follow-up discussion on the September 11 terrorist attacks in the United States and therefore comprised elements of the social studies and English curricular. The teacher informed the observer that ample discussion had taken place directly after the events and the teacher decided to undertake an examination of the issues two months after the attacks. The children worked in four cooperative groups of 6-7 students. Teacher C randomly organized the groups prior to the lesson by assigning them a number that indicated their group.

Teacher C began and concluded the observed lesson with the whole class sitting in a large circle on the mat and each child having the opportunity to say one word or idea related to the topic of September 11. The lesson was two-fold. The first objective asked the students to determine how the world had changed since September 11. Each group reported their results back to the whole class. After the whole class discussion, the students were informed of the second objective which asked them to take the point of view of either an American child whose mother had been killed on September 11 or of an Afghan child who was forced to flee his/her country because of the war. The results of these discussions were also reported back to the whole class. The teacher circulated around the classroom working with each group throughout both activities.

Teacher D

Another first-year teacher, Teacher D was a colleague of Teacher A's working in the same decile 10 school that strongly supported new information technologies in education. Teacher D also perceived the school to be very supportive in promoting student thinking. Having worked outside of education prior to teaching this Year 4 class, Teacher D combined a personal interest with the school ethos in promoting student thinking. Responding *very often*, like Teacher A, on the self-assessment statement about collegial discussions related to challenging students' use of higher order thinking skills reflected the support Teacher D felt from the school environment. Interview comments also reinforced this perception of a supportive school.

Teacher D marked *very often* to statement 6: *I consistently use specific terms to describe the different types of thinking used in the classroom.* This emphasis on specific language was evident in the observation and restated in the interview. During the interview, Teacher D referred to responses that had been prepared prior to the

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occasion. Teacher D answered each interview question in detail except for question 13: *Do you believe that classroom management has an affect on your instruction of thinking skills in the classroom? If yes, in what way? If no, why not?* Teacher D replied, "I don't know how to answer that," and the interviewer did not expand on the questions in an effort to avoid making a leading comment.

For the observation, Teacher D planned a whole class reading lesson related to a wharenui as a follow-up to their previous day's visit to a marae. The children alternated reading excerpts from the School Journal article, *Not Just A House (2001)*, and said 'pass' if they preferred not to read. The lesson was loosely structured around the 'reciprocal teaching' concept. Reciprocal teaching is a method of reading comprehension that uses cognitive strategies, predicting, questioning, clarifying and summarizing (Palinscar & Brown, 1997). Throughout the lesson, the children asked questions of each other, seeking explanations of terms and checking for understanding. They also predicted, clarified and summarized within the reading lesson. After the class finished reading the article each student individually drew a diagram of the outside and inside of a wharenui that was used as a portfolio sample.

Teacher E

During the data gathering period, Teacher E was teaching a Year 5 class in a decile 10 school. Remarks from the interview indicated that the school environment was semi-supportive of promoting student thinking. In the interview, Teacher E referred to the existence of GATE extension lessons and the notion of Glasser's Quality Schools as the school's approach. The concept of Glasser's Quality Schools involves teachers, principals and superintendents (an administrative position in the US public education system) managing students through leadership rather than as authoritarians, and encouraging students to produce 'quality' work (Glasser, 1992). Teacher E earned a Bachelor of Arts degree in psychology before becoming a teacher and spoke of a personal interest in this research topic. However, on the self-assessment Teacher E responded *seldom* to statement 11: *I make time to think deeply about my teaching*. The other responses varied between *very often*, *often*, and *sometimes*. Teacher E had been teaching for eight years at the time of the interview and was relocating to the South Island at the end of the school year.

The lesson Teacher E selected for observation centered on the Health and Physical Education curriculum. In the Think-Pair-Share lesson the children were asked to brainstorm issues about their safety at school and explain why these issues were healthy or unhealthy in their school environment. They worked in self-selected pairs and the teacher rotated between groups. At the end of the lesson the student pairs each reported one finding, careful not to repeat an issue already mentioned.

Teacher F

Teaching a Year 3/4 class in the same decile 4 school as Teacher B, Teacher F was completing a second year of teaching at the time of the data gathering. Teacher F was personally interested in the promotion of student thinking and mentioned an interest in research and the pursuit of advanced qualifications. Teacher F responded *very often* to statement 11: *I make time to think deeply about my teaching* and came to the interview with prepared responses. On more than one occasion this teacher spoke of a focus on 'surviving' as a beginning teacher. Many interview remarks emphasized the attention this teacher gives to the emotional and social aspects of the students' lives. Teacher F's response to interview question 5: *What are some examples of thinking tools you use in your classroom?* was "I don't actually know what thinking tools are. I do a lot but I can't label it". When probed to explain some activities, Teacher B continued with examples of group work, brainstorming, brainteasers, and KWLs (a graphic organizer for recording what I know, what I want to know and what I've learned). At the end of the interview Teacher F asked in reference to the self-assessment, "I didn't think I rated myself quite high so was I actually that high?" Out of eighteen statements, Teacher F responded *very often* or *often* on eleven. At the end of the school year, this teacher relocated to another school.

For the observation, Teacher F selected a small group reading lesson. The other children in the class worked independently on activities at tables as this group of five students read a folktale on the mat called *The Big Fat Pancake (1989)*. Each child read a passage from this School Journal story and had an opportunity to discuss his or her experiences with pancakes. They considered the meaning of the story and feelings they had experienced when they had lost something. Teacher F stopped intermittently between paragraphs to clarify vocabulary, discuss ideas and check for understanding.

PART ONE: SELF-ASSESSMENTS

After the teachers received O'Brien's teacher self-assessment scale on promoting student thinking in classroom learning, they responded to eighteen statements which they subsequently returned to the researcher (refer to Appendix I for a summary of the teachers' responses). The choice in response was *very often, often, sometimes, seldom,* and *never* indicating the frequency of that statement in their teaching practice. While the assessment did not allow an opportunity for expanded answers, it did provide a source of data with which to compare responses to particular statements, facilitating an analysis of the teachers' self-perceptions in promoting student thinking. Used in conjunction with the observations and interviews, the self-assessments provided a platform for triangulation, to ensure the validity of the results.

The responses varied on each statement with no statement receiving a uniform response. However, no teacher selected the *never* response and all teachers chose *very often* and *often* at least once. Responses were made on all statements except:

> 15. *I give students opportunities to investigate subject-related, self-generated problems.*

Teacher C wrote a question mark next to that sentence and left the response blank.

The statements that garnered the most positive responses, indicating that the actions occurred frequently were:

> 7. *I plan opportunities for students to actively listen to each other.*

and

> 14. *I have students use some graphic representation (e.g. concept mapping) to summarise their thinking.*

There was little variation in the responses with the teachers equally selecting *very often* and the other half choosing *often* on the above statements.

Five of the six teachers selected *often* as a response to the statements:

> 1. *I ask students to explain the reasoning behind their questions.*

and

18. I expect students to challenge each other's ideas in the classroom.

Another statement that generated little variation in the response was:

10. I expect students to generate their own hypotheses.

All teachers selected *often* or *sometimes*, except Teacher C who circled both *often* and *sometimes*. For graphing purposes (Figure 1), a value of .5 was given to each response since the opinion of this teacher seemed divided between the two. With the selection of *often* and *sometimes*, it appears this action transpired less frequently than the two previously mentioned statements.

The only two statements to generate the *seldom* response were:

11. I make time to think deeply about my teaching.

and

13. I expect students to think through the steps they will use to solve a problem before they write anything down.

In an examination of all the assessment responses *seldom* was selected a total of three times: by two teachers on statement 11 and one teacher on statement 13. In addition, these two statements acquired the largest variation in responses ranging from *very often* to *seldom* (Figure 2). Assorted mixes of *very often*, *often* and *sometimes* were the responses given on the remaining ten statements (see Appendix I for a summary of the self-assessment responses).

Figure 1: Graphic representation of self-assessment statements that produced little variation in response

7. I plan opportunities for students to actively listen to each other.

14. I have students use some graphic representation (e.g. concept mapping) to summarise their thinking.
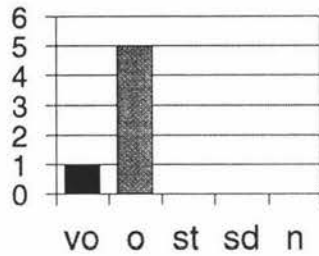
1. I ask students to explain the reasoning behind their questions.
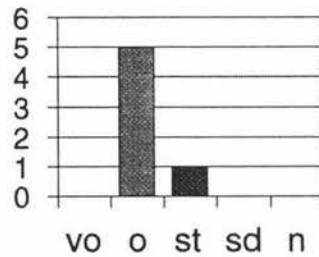
18. I expect students to challenge each other's ideas in the classroom.
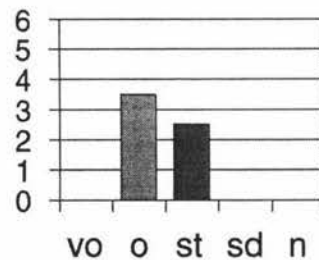
10. I expect students to generate their own hypotheses.

Legend:

vo: very often
o: often
st: sometimes
sd: seldom
n: never

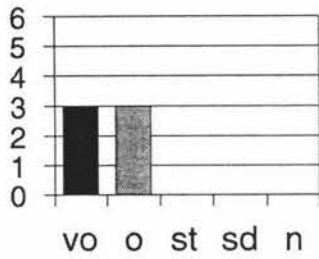*Figure 2: Graphic representation of self-assessment statements that produced a wide range of response*
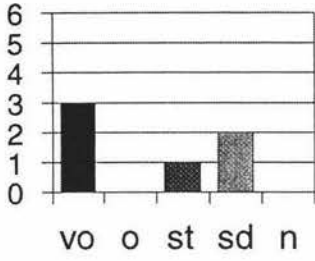
11. I make time to think deeply about my teaching.
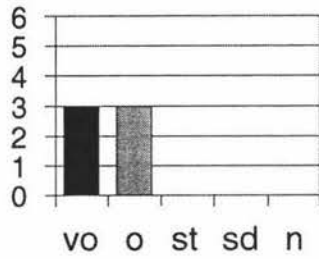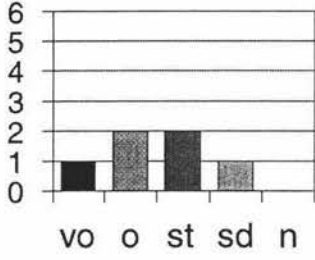

13. I expect students to think through the steps they will use to solve problems before they write anything down.

Legend:
vo: very often
o: often
st: sometimes
sd: seldom
n: never

PART TWO: OBSERVATIONS

The observation criteria for the teachers involved self-selecting a lesson that they believed reflected the promotion of student thinking in their classrooms. This open criterion was intentional, allowing for a range of perspectives to be examined. The teacher-selected lessons also minimized the affects of the observer by facilitating the comfort and ease of the teachers and students. An excerpt from an observation transcription is located in Appendix J.

Common themes emerged from these observations and were coded for analysis. They were: a safe learning environment, the importance of listening to each other and sharing ideas, invoking prior knowledge and the experiences of the child, an expectation for reasons behind statements, and the use of various thinking tools. Another prominent theme present in every observed lesson except one, involved elements of student choice and decision-making. Examples of the categories coded from the data, can often relate to several of the themes that emerged due to the integrated nature of promoting student thinking.

A Safe Learning Environment

A safe learning environment is one in which the children feel comfortable to express themselves. There is an acceptance of all ideas, students are valued, risks are taken and ideas are challenged. All teachers were positive with the children and had created relaxed, non-threatening atmospheres in the classrooms.

Throughout the lesson Teacher D often said 'thank you' to the children after they had helped each other clarify terms or answer questions. Consistently waiting 2-8 seconds after asking a question before looking for a response contributed to the feeling of ease, safety and thoughtfulness present in Teacher D's classroom.

Teacher D:	Does anybody need anything clarified? Anything you haven't understood still? (pause) Michail?
Michail:	Maihi.
Teacher D:	Who can help Michail with that? (pause) Grant?
Grant:	It says they are the arms because that's what they look like, arms on the meeting house.
Teacher D:	Thank you. Does anyone need anything else clarified?

Teacher E's lesson was focused upon safety in the school environment and covered a range of physical and emotional issues such as bullying, water near electrical outlets, drinking water to keep you hydrated, keeping the classroom tidy, theft of personal property, and people helping and speaking nicely to each other. The students were asked to recall incidents that had made them feel unsafe as well as times in their lives when they felt they had done "something really well". The teacher also shared a personal story about pride s/he felt from an accomplishment as an example for the children.

Laughter was evident with one student responding to the question of what helps keep the school environment safe, "A nice teacher that is funny, for example Teacher E". There was also honesty and an element of risk-taking amongst peers. When Teacher E asked the children to share something that could keep them from learning, the very first idea offered in the class discussion was associated with the school's track and field day. Demonstrating an element of risk-taking in relation to the opinion of his peers, a Year 5 boy revealed that his learning had been affected because, "I was nervous about the 800m race".

Teacher C directly commented on the personal lives of two boys in the classroom when working with their groups. Direct, personal comments could embarrass students who did not feel a sense of security and safety in their learning environments. The boys shared their ideas freely with the group when questioned by Teacher C about some difficult issues. Two examples follow. In the first example the discussion is related to the group's assigned task of commenting from the point of view of an American child whose mother was killed on September 11.

Teacher C:	Monty, why wouldn't you want a war to happen? (pause) You wouldn't want America to go and get Osama bin Laden?
Monty:	Because a lot of people, a lot of mums, more childs are going to die. More people will be like me!
Teacher C:	And so you don't need any more people to die and be the same as you?
Monty:	Yeah!
Teacher C:	(to the observer) Monty is our most sensitive boy in the class.
Monty:	Yay! (Monty makes a cheering gesture with his arms and face)

Another example:

Teacher C: What is *your* religion?
Jay: Muslim.
Teacher C: Muslim (pause). Osama bin Laden is Muslim also. How does that make you feel?
Jay: (pause) It's actually Osama bin Laden's fault. He's the one who started the war. My mum figured that out straight away. It wasn't actually America's fault. It was Osama bin Laden's because he actually sent those people out to hijack the Twin Towers, Pennsylvania and (pause) and the Pentagon. It was actually his fault.

When observing Teacher A's lesson, some groups were observed working independently, without the presence of the teacher. The students often invited the observer into their discussions. While the observer refrained from making comments or asking questions throughout most of the observations, sometimes questions were asked. In one incident, a group was explaining the Six Thinking Hats to the observer while Teacher A was working with another group. The following excerpt portrays an image of their interactions with each other:

Tom: It can get confusing. Sometimes it's really hard to use the hats when you keep using lots of hats because sometimes I get mistakes with green hat.
Observer: What do you do if someone makes a mistake?
Michelle: We just tell each other really nicely, "Oh, that's red hat and you should not have put it in yellow hat" because maybe they, some people don't really understand the meanings of each hat so we just have to help them out a bit and tell them nicely.
Tom: But they did the best they could!

Teacher B ensured that the climate in the classroom allowed for a wide variety of comments and input from the children with respect towards each other and the teacher. The atmosphere was relaxed with a feeling that they all could help each other and that mistakes were a part of the learning process.

Max: You forgot the 'g' on the 'roaring'.
Teacher B: Oh, so I did. There. I am making lots of mistakes this morning.

There were also examples of students challenging each other's ideas evident in this discussion about volcanoes and vulcanologists:

Richard: Why would they want to go and watch it? They might get killed.
Teacher B: They might and some vulcanologists actually have gotten killed but there are some willing to take a risk and get some good photos.
Nicholas: But they risk their lives when they do their job.
Teacher B: They do.
Richard: And they just want money! Money! Money! Money!
Nicholas: Yeah! And what's so good about money?
Debbie: Because if you don't have money then you can't buy food and then you'll *starve* to death.
Nicholas: But you don't have to get rich to have food!

Teacher F interacted with the students in an expressive manner and compliments on their reading were regularly given to the children. The remainder of the class worked confidently on their tasks, asking each other for assistance rather than disturbing the teacher and the reading group during the observation.

Teacher F: What's your favorite thing to put on top of pancakes?
Christy: Strawberries.
Teacher F: *Mmmmm!*
Billy: Syrup or lemon and sugar.
Teacher F: I was waiting for that one...I *love* lemon and sugar on pancakes. That is so nice!

The excerpt from Teacher F's lesson also illustrates an opportunity for the children to listen to each other and share their ideas, another theme common in all the observations.

Listening and Sharing Ideas

In each lesson, listening to each other and sharing ideas was an integral element incorporated in these learning environments. The children seemed familiar interacting with each other in a manner that was respectful and valued the contributions of each member. More often than not, they allowed each student his or her time to contribute without interrupting. The children demonstrated the skill of building upon each other's comments by listening to the remarks of others followed by relevant questions or comments. Teachers A, C, and E presented lessons that required the children present

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information in small groups or to the whole class. Generally, the presentations were given with confidence and received with interest.

In Teacher A's lesson, the planning and structure relied solely upon the students' abilities to listen to each other and share ideas. The students' comments were made in consideration of previous statements, indicated by phrases such as "I think the same as Sam because..." or "for me" or "I think [idea or word] as well".

At the beginning of the lesson, Teacher B immediately encouraged a listening and sharing activity by asking students to disclose some of their ideas from a previous day's work on similes. One student, Debbie, had been absent during the brainstorming activity.

> Teacher B: Can you just put your hand up if you had a really good simile the other day and share some of those so that Debbie can get a good idea and then perhaps contribute some herself?

Twelve children then shared their ideas followed by Debbie's contribution.

Teacher C started and ended the lesson with the children sitting in a large circle on the mat so they could each see whoever was speaking. To begin the lesson, each student was asked to share one word about September 11. After the cooperative group work, Teacher C ended the lesson by asking each student to make one comment about the war between the United States and Afghanistan from their perspectives as students living "thousands of miles away" in New Zealand. Children were given the option to 'pass' if they did not want to make a comment.

Teacher D loosely structured the observed reading lesson around the reciprocal teaching format that requires listening and sharing ideas to be effective. It was the students, not the teacher, who formulated comprehension questions for an evaluation of passages read. The students asked questions for clarification and they sought answers from each other. The students also predicted within the lesson and summarized passages aloud.

Teacher E's Think-Pair-Share lesson planted itself firmly within the listening and sharing domain. Expectations for listening and sharing were also incorporated in the group discussion before and after the paired activity.

Prior Knowledge and Experiences

In an effort to make learning more meaningful, the teachers engaged their students in questions and activities that incorporated the prior experiences or knowledge of the students. All the observations revealed a link to the 'real-life' of the child. Whether made in relation to each individual child or to the class in general, each teacher explicitly made a connection to the issue being discussed and the children's own lives.

Teacher A investigated what a child already knew in order to better facilitate her learning. When a new child in the class did not offer an opinion about the topic of aliens that the group had been discussing in detail, Teacher A asked, "Have you talked about aliens before?" Realizing that she had not, Teacher A then redirected the question, "Has it [the group conversation] given you a little to think about?"

In the cinquain lesson on volcanoes, Teacher B referred to diamante poems that the students had written prior to the lesson on cinquains. Teacher B asked them about the pattern found in diamantes to form a link with the pattern evident in cinquain poetry. In addition, pictures from the most recent eruption of Mt. Ruapehu, an active volcano located in relatively close proximity to Auckland, were also presented as a motivational tool for phrases and ideas in the students' poems.

Teacher B: ...this shows the smokiness of it. And this was down in Happy
              Valley if you've ever been skiing down there, the snow was all
              covered in ash. Look, they made a face by making some marks in
              the ash in the snow (referring to an aerial shot of a giant smiley
              face in the snow/ash).

Some students struggled with the meanings of the te Reo Maori vocabulary during the reading lesson in Teacher D's class. Though his answer was inaccurate, one child

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attempted to define the word *kowhaiwhai* using his prior knowledge of te Reo Maori. The student explained that he believed it meant "yellow something because kowhai means yellow". Teacher D specifically cued some students to find the answer to this question reminding them, "The people who were in my group at the museum yesterday should be able to help Markos out with that one".

Teacher C knew that every child in the class had knowledge about the events of September 11 because they engaged in many related discussions immediately after this date. Comments about their first reactions to the events indicated that it was an issue the students had related to their own lives. Three students discussed their first thoughts about the tragic events of September 11:

Fraser:	I was scared! I was scared because it might have done a World War.
Pam:	Then New Zealand might be in the war and my dad might have to go to fight.
Tracy:	Yeah, she'd (referring to Pam) be scared because her dad is in the Navy.

In another group, Hamish elaborated on the concept of a 'world war'. He explained to Teacher C how the learning environments for students in his school would change if one of the school's male teachers left to become involved in a war, explaining "most men everywhere, if you are a male and there is a war you have to join in the fight". Hamish described how New Zealand could become involved stating, "if it's a *world war* that would mean everyone in the world has to fight for the country that they wanted to have on their side". Two months later it remained an issue that affected some students' lives. Teacher C asked, "How do you feel as a New Zealander looking up and seeing America at war with Afghanistan?" and Kurt replied, "I feel (pause) worried!"

Teacher E and F linked the content of the lesson to the feelings of the students in their classes. Relating to an incident in the story they were reading, Teacher F asked the students, "How did it feel when you'd lost something and you really needed to find this thing? How did it feel when you finally found out where it was?" Expanding on a student's comment about how his nervousness affecting his learning, Teacher E queried the class, "If you feel nervous, it's really interesting because what happens to

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your body when you feel nervous? (pause) If you think back to doing the production in Term 3 you've probably had this experience" (lots of hands go up – teacher is smiling looking around class).

Thinking Tools

The six teachers utilized a wide range of specific tools to promote student thinking. Throughout the entire lesson Teacher D constantly provided substantial wait time, allowing more children to formulate their thoughts before commenting. De Bono's Six Thinking Hats were a core element of Teacher A's lesson and a child in Teacher D's class made reference to the white hat, reflecting its previous use in this classroom. During the observations, Teachers A, B, C, and E utilized graphic organizers. Every teacher engaged his or her students in higher-level questioning. Teachers C, E and F primarily used 'how' and 'why' questions in their lessons.

Along with a brainstorm, Teacher C utilized a significant amount of 'why' and 'how' questions throughout conversations with various groups. "How would that change my life?" "Even if my relatives, even if I don't know anyone who died, I'd be *worried sick*. Why would I be worried?" Teacher C also explained to a group that the 'why' question is a difficult to question to answer and modeled this by asking a 'what', 'where', 'who', and then a 'why' question related to September 11 and America's attack on Afghanistan.

Teacher B used a prior brainstorm to help generate further ideas for the cinquain and another graphic organizer to categorize the various types of words and ideas the students had created before they embarked on their poetry writing. Teacher B also pointed out strategies the children could use indicating that the cinquain followed a pattern similar to the diamante poem they had written previously. When exposing the students to a new word Teacher B did not define it for them, rather this teacher reminded them of a strategy they might use to determine its meaning: "There is some quite good vocabulary in this line, 'renewing the earth's firmament.' You may not have heard that word 'firmament' before but you might be able to work out what it means from the sentence".

Student Choices

In every observed lesson except Teacher F's, the students were given varying degrees of choice in their learning. This ability to make their own decisions was evident in different examples.

Teacher A provided student choice on the observed lesson by allowing the students to select the type of current event that interested them and the framework with which to report it. Teacher A commented to one student who had chosen an article about aliens, "I can imagine this sort of news item appealing to you Sam". After ensuring the dimensions of the chosen reporting framework were incorporated into the news report, the students directed conversation on the topic.

Teacher E allowed the children to self-select their partners in the observed Think-Pair-Share health lesson.

> Molly: Well, can we sit with our friend?
> Teacher E: I'll let you choose who you go with but I want you to be in a pair and we can have one group of three if you want. Right, I'll let you get yourselves organized into pairs and then we will have a look at our groups.

Teacher B discussed metaphors, similes and onomatopoeias with the children during the poetry lesson. When one child asked, "Can we use made up words?" Teacher B responded, "Well, I guess you could if that's the best way you could describe it," allowing for the possibility within the realm of the exercise.

Teacher C asked the children to decide who would take on each role in the cooperative group activities. The students were also given the opportunity to present a summary of their discussions in various ways. The options were not discussed beforehand and the possibility for presentation variations seemed to be a known factor. Some children chose to have only the 'reporter' give the information, others stood with the reporter as the information was read and still others coordinated their presentation so that everyone in the group read an item.

After choosing whether or not to read parts of the article about a wharenui, the students in Teacher D's class were given a choice about how to draw the inside with attention to varying perspectives explored:

> Teacher D: You're going to have to think about that. Are you going to take a bird's eye view, looking down (physically moves to look down)? Are you going to turn it on an angle (using hand) slightly so you're looking in through the door? Are you going to do it like this picture over here (walks to the picture in the room)? It's a cutaway. They have drawn it in 3D and then pretended that they've taken the roof out.

Expectation for Explanations of Reasoning

In some instances, the children proffered explanations of reasoning without prompting and in others the teacher prompted remarks. The high use of 'how' and 'why' questions resulted in frequent student explanations for the reasons behind their statements. In one example, Sam, the reporter in a group in Teacher A's class, shared information from an article about Britain's decision to no longer look for aliens. Teacher A asked why he wrote "aliens aren't friendly" under the yellow hat [benefit] instead of the black hat [weakness] and Sam explained, "It would be a black hat if we *found* them. Because if we don't find them, and they aren't friendly then that's a good thing. That's all saying that they are out there". He also made clear that he did not write many details under the white hat [facts] because, "most of this article was about the opinion of the government".

When prompted to explain their statements, the students in all classrooms did so without hesitation exemplified by Teacher F's and B's examples:

> Teacher F: How do you know when to flip a pancake?
> Chloe: Because there's bubbles.
> Teacher F: Ahh, that's another way of telling, yes! Can you explain it more?
> Chloe: The pancake gets so hot that it bubbles.

In a discussion about some of the volcano photos that Teacher B shared with the class, one child exclaimed that the volcano pictured in an article that Teacher B was holding was a shield volcano. Teacher B responded, "Yes! How did you know that was a shield

volcano Nicholas?" Nicholas replied, "because instead of blowing from its sides, it spits out the lava".

PART THREE: INTERVIEWS

Shortly after the observations, the researcher conducted focused interviews, interviewing each teacher individually in a semi-structured format allowing for open responses to the questions (Appendix K). The interview questions were grouped under four headings: teaching rationale, teacher's role in promoting student thinking, formative influences on their teaching and assessment. Each teacher was asked the same twenty-seven questions with additional questions sometimes asked to probe or clarify responses. Through this method, information was attained and compared with the observation and self-assessment data for analysis and validation through triangulation. The interview offered insight into the beliefs, attitudes and motives of the participants. It provided a further exploration of some aspects of the responses to the self-assessments, while also illuminating teacher perceptions that might not have emerged in the classroom observations. Due to the integrated nature of promoting student thinking, the examples often embody more than one theme.

Teaching Rationale

Under the teaching rationale, the theme of a holistic approach to teaching including the development of self and skills related to thinking resonated through every interview. Comments like "learning as a whole person", "global person", "think for themselves", "transferable skills", "learning how to learn", "empowering learners", "independent thinking" and "facilitator", reflect the responses of the teachers with Teacher C and F actually using the word "holistic". Teacher C made the only direct reference to employment skills expressing an "aware(ness) that these children are...going to get out into the workplace one day". When asked about the type of thinking consciously being promoted in their classrooms, the teachers responded with "critical thinking", "creative and divergent thinking", "making a decision for yourself", "higher order thinking", "problem solving", "conflict resolution skills", "emotional intelligence" and to "value themselves".

Teacher's Role Promoting Student Thinking

Six themes from the interviews emerged from the teachers' responses to their role in promoting student thinking through various strategies. They were: the class climate, the necessity for direct teaching of thinking skills, the importance of modeling, the significance of language, the value of reflection and the use of a variety of tools.

Class Climate

All teachers interviewed described the importance of 'positive' class climates. Teacher B explained the affects of positive recognition:

> Praise creativity and any examples of divergent or creative thinking so that you encourage them and they want to do that and share it with the children...so that they'll want to produce ideas like that.

Teacher D explained a method employed in consideration of the class climate:

> We have a sharing circle. So that's really sort of an emotion thing, like keeping ourselves safe, and those things we share in the sharing circle...you're allowed to say whatever it is you want to say for as long as you want to say it but people don't rave on.

Attention was given to verbal and non-verbal interactions of the children when discussing the climate of the class. Teacher F elaborated: "hearing other people's reasoning, totally different opinions...it might bring more acceptance". Teacher B's comments demonstrated an emphasis on respecting and valuing the unique contributions of each class member: "to appreciate diversity so the children feel that they can give their opinions and that they are going to be appreciated". Teacher C referred to positive student interactions as an important "chance to give another viewpoint" and offered this suggestion:

> One of the simple things is...to allow for a large mat so we can all sit in a circle and everyone is facing everybody. That way there is no one sitting at the back and if someone says a comment everyone is facing them. I think there is a higher degree of interaction as a result, even non-verbal interaction.

Another example of verbal interactions affecting the class climate was reflected in the emphasis on constructive criticism during peer evaluation. Teacher D referred to "using the green hat [new ideas] and the yellow hat [benefits] when we are giving feedback...rather than focusing on what they did wrong". Teacher F explained that in

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the peer appraisal of art, each student is encouraged to say "what you really like about the other's art work" and one thing that could be improved, focusing on "technique, like are there white spaces where something should have be colored in and is the dye covering the whole page or are there bits that have been missed out?"

Cooperative groups and the involvement of students in decision-making were mentioned as tools in the classroom that affected the climate. Teacher B commented on the individual student's responsibility in the class, "I have an emphasis on self-management and internal rewards". In reference to cooperative groups, Teacher A's remark revealed the conscious and continual effort necessary for the success of the existing groups:

> It's amazing because they get to value each one in the group…it takes six weeks at the beginning of the year to actually establish that culture and then you're working on it everyday – it's like a relationship.

Direct Instruction of Thinking Skills

Asking the interview question: *Why do you think the direct teaching of thinking skills is valuable?* revealed the researcher's bias towards incorporating elements of direct instruction into the learning program, however it was also put forth to unearth the teachers' views on whether thinking skills comprise a stand-alone area or a component that should be integrated into every subject. The teachers all agreed that the direct instruction of thinking skills was necessary and the main reason given in support of this viewpoint centered on the difficulty children have in recognizing their use of a thinking skill. Teacher D provided a clear explanation of this issue, summarizing many of the comments:

> It's a really abstract concept. It's not something you can really provide a hands-on experience for and children will figure it out for themselves. It's something you have to start teaching directly and then…integrate it into all that you are doing.

Modeling

Every teacher interviewed mentioned the importance of modeling. Modeling by the teacher was emphasized when introducing thinking skills and tools. Teacher F summarized the importance of modeling by saying, "they see it, they do it" and "I

model the strategies and then they have a repertoire to use". Teacher A encouraged the children to challenge each other's ideas through modeling:

> I do it to them first. I always say, "How do you know?" "What makes you think that?" My answer is, I don't like the word *answer* actually. I'd rather have a *response* so I always try to respond with questions…and that's what I encourage them to do.

Teacher E held a similar viewpoint, "if they're asking me questions, I'll rephrase it back to them or direct it back to the class to answer instead of me".

The teachers believed in the importance of identifying and using specific thinking skills. Therefore names were attached to the skills as they were used such as predicting, clarifying and summarizing instead of "What do you think?" This practice was complemented with thinking out loud or discussing other ways and opportunities to use these skills. Teachers viewed this as important for "showing them the processes". Teacher C believed metacognition was a vehicle for, "getting children to think then reflect on …the thought processes they used to arrive at the point they did". Teacher A supported metacognition and believed that by making children "aware of the processes," they can "actually realize that they are doing and using thinking skills".

Teacher A remarked, "I make heaps of mistakes and take risks". Teacher B remarked that through modeling students can also see that, "mistakes are OK – they know I make them too". Elaborating further on the acceptance of making mistakes, Teacher B explained:

> Even if someone gives an answer that isn't correct, say, "It's really great that you thought about that really well. I'm glad you're thinking," so that they don't feel they are only going to say something unless they know it's right. I think that's important.

Students can provide examples of modeling for each other, therefore the role does not rest solely with the teacher. Teacher B illustrated this issue:

> I model myself quite a lot and discuss, and if somebody else has a good idea or way of doing things we use that…demonstrating by modeling, not just me modeling but modeling what other children have done too.

Teacher D commented on using students to model thinking processes. Referring to a reflective mathematics learning center activity, Teacher D remarked, "sometimes I get people that have done that to stand up and share what they've written".

Language

The power and influence of language surfaced in every teacher interview. "I like having the language to be able to talk with the children about thinking," remarked Teacher D. Various examples illustrate this. Teacher B explained:

> I think language is vital and that we need a very wide, varied vocabulary. They need lots of different ways of saying things so that they can improve their self-expression...As to a limit, as far as I'm concerned, if they can understand and do it then I don't care what age they are, then they are ready for it. I think that improves their ability to think and express themselves.

Teacher C echoed a belief in the crucial role of language, "I think it's really important because it sort of denotes the processes involved". Teacher D elaborated on utilizing sophisticated vocabulary with middle and upper primary students:

> When I introduce a word, we'll talk about what it means but from then on I wouldn't use 'take away' for subtraction. *They* still use it but I don't. Like estimating, some teachers use 'guessing', but it's not a guess. It's informed and reasoned.

Other examples of using specific language included understanding the difference between *open* and *closed* questions. Some teachers remarked that this distinction assisted the children during interviews and self-directed research projects. Teachers A, D, E, and F explicitly referred to the importance of "I" statements as a strategy the children were taught in relation to conflict resolution.

Reflection

Reflection comprised a regular element of every teacher's planning. Self-evaluations and peer evaluations through discussions and journal entries surfaced in each interview. Teacher C referred to a school-wide use of personal student journals for reflective activities. Each student's journal had a note in the front to parents explaining "these are for personal reflection and the teacher will read them but won't make comments on them".

Goal setting materialized as an additional vehicle for reflection. Depending on the teacher, the children evaluated their goals daily, weekly and/or at the end of each term. "They are constantly monitoring how they're getting on themselves. I try to make them responsible for themselves," explained Teacher B.

Examining learning processes was an important reflective activity referred to by three teachers. Teacher F enjoyed working with the new Ministry of Education mathematics programs explaining, "You don't actually make the emphasis on the answer you make the emphasis on the process to get to the answer". Teacher B also supported these programs accenting the reflective components:

> I find the ANP is really good for getting them thinking about maths, getting them problem solving, thinking about strategies, and sensible answers. It's really stressing estimation so that they can know whether their answers are sensible or not so they come having to think: Does that make sense? Is that sensible? How am I going to do this? How is that related to that? So it's really forcing them to think all the time.

Teacher E referred to contemplating the learning processes through mathematics as well, advocating that modeling reflection was important for, "showing those processes and in things like maths talking about problem solving strategies". Using the sharing circle as a format to reflect on learning processes, Teacher D said, "Sometimes in sharing circle we'll just talk about what they've learnt or how they learned it".

Teacher C elaborated on an incident in the classroom related to the importance of reflection for facilitating the transfer of strategies from one context to another:

> I was modeling it [classification] but in a different area to see if they could then transfer the skill and most of them struggled to do that in Year 4/5...The DP, in the reports, made the comment that they could classify since Year 2 but maybe they weren't quite aware of what the *concept* of classifying was as opposed to simply classifying blocks into long and short and cut and colors.

Teacher A was deliberate in his/her effort to promote the transfer of thinking skills and strategies, encouraging their use in other contexts. In the interview, Teacher A referred to making comments such as, "Hey, look what you can do with this!" when teaching a thinking skill.

Both Teacher A and Teacher D referred to the use of the Six Thinking Hats as a reflective tool in their classrooms. Teacher D remarked, "They're using blue hat all the time, the metacognitive hat, when they are talking about the hats". Considering the issue of reflection Teacher A observed, "It's actually quite inherent in here, intrinsic". During the observation, the students in Teacher A's class reflected on the benefits of using the Six Thinking Hats framework and one explained how the 'hats' were "...a part of life. You couldn't *not* use them". Another child commented, "they are life skills" and a peer elaborated on that remark, "they are the life skills of thinking" and are important "because when you want to do something, you know there's a sort of a plan, a thinking plan to think it out and to do it. You have to think it out". One student revealed, "you use them all the time without realizing". In a separate cooperative group another child made a similar statement, "there are some occasions when I don't *think* I'm using a hat but I am".

Thinking Tools

The teachers utilized a wide variety of thinking tools. Tools commonly used by all the teachers and evident in this research included: questioning, brainstorming, graphic organizers, decision making, planning, predicting, evaluating, point of views, creating, and communicating with clarity. Other tools mentioned but not used by all the teachers included de Bono's Six Thinking Hats (1992), Bloom's taxonomy of higher level thinking skills (1956), Gwen Gawith's Action Learning (1988), David Hyerle's Thinking Maps (1996), Tony Buzan's Mind Maps (1992), Tony Ryan's Thinker's Keys (1993), Palinscar's and Brown's Reciprocal Teaching (1997), planning lessons that incorporated Gardner's theory of Multiple Intelligences (1993), learning centers, and the use of *Inspiration*, a brainstorming/graphic organizer computer software.

The Development of Professional Knowledge About Thinking Skills

The participants' responses to questions about the influences that affected their teaching, provided the researcher with data describing the development of their professional knowledge about thinking skills. Learning how to promote student thinking developed from a range of sources from an independent personal interest to total school support. "Lots of books" and "read, read, read" were comments related to the personal professional development pursuit of promoting student thinking. Teacher D elaborated, "I just need to sit down, learn about it for myself and then figure out

what kind of learning experiences I'll provide". Teacher A's and D's school had "two staff meetings dedicated to thinking skills per term". It was the principal from Teacher C's school who invited the researcher to a thinking seminar and Teacher C remarked on the supportive school environment:

> There is an ethos in the school for encouraging thinking skills. Philosophy and metacognition are examples of that and that ethos has worked out. We had a Teacher Only day...that was just professional development on meta-cognition...there is a lot happening in terms of promoting and challenging our own thinking on matters of education. The principal is always coming back to use with 'there is this research in terms of such and such' etc., etc.

Some teachers discussed the support of colleagues as constructive critics, resource banks, and collaborative partners. Teacher A reminisced about an influential event that happened shortly after re-entering the world of teaching following a fifteen-year hiatus.

> When I got back into teaching, my senior teacher gave me *Adventures in Thinking* [by Joan Dalton] and it was wonderful! I can remember the day she gave it to me. I can remember thinking, "*This* is what teaching is all about!"

Time was the main obstacle in promoting student thinking that four teachers mentioned. Three of these teachers included the "restraints of the curriculum" and "balance" as contributing obstacles. Teachers D and E replied that their own lack of knowledge was their biggest obstacle.

Assessment

Because the teacher self-assessment and the observations lacked information on the assessment of thinking skills in the middle and upper primary classrooms, the data obtained from the interviews cannot be triangulated. The lack of other data sources was a limitation imposed by the research design. However, as a matter of interest and perhaps as a prompt for further investigation, the researcher will present information obtained about assessment from the interviews.

All of the schools in which the teachers worked in incorporated assessment of the Essential Skills in the *New Zealand Curriculum Framework (1993)*. Four out of six of the teachers remarked that their schools did not assess thinking skills. Teacher F stated that thinking skills were assessed because "identify, describe. That would be thinking.

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We don't have specific thinking learning outcomes but we do achievable learning outcomes that aren't fluffy". Identify and describe are verbs specifically mentioned in the information and problem solving components of the Essential Skills. Teacher E remarked that the school had in fact assessed thinking skills in a school-wide science assessment of a fair test design: "We recorded an assessment of their actual thinking and their processing by observing them throughout the experiment". No further information as to issues about the logistics of this undertaking or the number of students involved was obtained.

Most teachers indicated that they believed would be "quite hard" and "not easy to assess" thinking skills. Many felt that assessing thinking skills would be "subjective" because as Teacher E explained, "You can only tell about a person's thinking from the evidence they produce but you can't read their mind so your interpretations are always interpretations". Teacher A commented, "Sometimes you don't know what they are thinking because you haven't got the time to verbally interact with them on a particular occasion and if they can't write it down, they can't do it. It's a hard one".

SUMMARY OF THE DATA RESULTS

Combining the themes resonating from each of the three data sources revealed five inter-related emphases on: collaborative interactions between student and teachers as they listened, shared and challenged each others' ideas; questioning; the use of specific terminology; reflection; and students taking an active role in their own learning. Because the classroom observation did not provide a suitable data gathering forum on professional development, the issues related to this category emerged from the self-assessments and interviews.

The importance of listening to each other and sharing ideas that were sometimes challenged appeared throughout the various forms of data gathering. Lessons were planned to incorporate active listening and much of this was initiated through group activities. Different points of views were encouraged to provide challenging notions and time was allotted to consider more than one answer. On the self-assessments, statement 17 says: *I encourage students to like the challenge of difficult problems.* Though the challenging of ideas was evident in classrooms, ascertaining the level of encouragement for students to like the challenges of difficult problems could not be

determined. This is due in part because the issue was not evident in the observations or discussed in the interviews.

Both the children and teachers utilized questions extensively. The questions provided a catalyst for challenging ideas and probing statements and explanations. On the self-assessment scale, the teachers selected *very often* or *often* on statement 1: *I ask students to explain the reasoning behind their questions.* This, however, was not evident in the observations or interviews though explaining the reasoning behind their comments was. Exploring for questions rather than answers, as described in self-assessment statement 5 appeared only in Teacher A's lesson although it was modeled by many of the teachers. Teachers modeled 'open' questions and many indicated that their children understood the difference between open and closed questions because of focused lessons in which the terms were defined and utilized.

Using specific terminology repeatedly surfaced as a deliberate, conscious effort. Different types of thinking were specified and high-level vocabulary was encouraged. Differentiating the types of thinking by using words such as predict, clarify, and summarize rather than simply 'think' provided a tool for the teachers to utilize. Specific terminology was also present in reflective activities that the teachers incorporated into their teaching in diverse ways. Reflection at various levels included planning, redefining, evaluating, and metacognitive activities where the process of learning was considered. The metacognitive element of reflection was not evident in all teachers' observations or interviews. The response to the self-assessment statement related to planning the thinking required by the students in each lesson (statement 3) ranged between *sometimes, often* and *very often* as did discussing the types of reasoning necessary to complete a task (self-assessment statement 4). The students in every class used graphic organizers to reflect the products of their thinking. Many of the teachers expected the students to think through the steps they would be using for problem solving before writing anything down (self-assessment statement 13). Teacher D responded *seldom* to this self-assessment statement, however this process was evident in the observed classroom lesson.

Evidence of encouraging students to be active participants in their own learning appeared in all three data gathering sources. This included students making choices, using students as models for others, and expecting reasons behind statements for

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further explanation. Having students generate their own hypotheses (self-assessment statement 10) and investigate subject-related, self-generated problems (self-assessment statement 15) did not feature in the observations and interviews. The self-assessment responses to these statements indicated the frequency was low with no teachers responding *very often*. However, Teachers A, D, and E referred to using Gawith's Action Learning program (1988) which involves elements of subject-related investigations that often include self-generated problems.

Professional development opportunities for the promotion of student thinking included personal reading, collegial support and varying degrees of support from the school environment. The perception of school support varied between two teachers at the same school, Teachers B and F. Teachers A and D agreed upon a high-level of support in their schools during their interviews and in responding *very often* to the self-assessment statement related to discussing with colleagues how to challenge students' higher order thinking skills (statement 12). Teacher C selected *sometimes* in reference to this statement but described a very supportive school environment in the interview.

This chapter has presented the results from the qualitative case study data. In Chapter 5, a discussion links the results with relevant research and literature in the field of student thinking.

Chapter 5

Discussion

> "It's amazing how far you can take it with just a little bit of teacher knowledge and how much it adds to the learning in the classroom."
>
> Teacher D, referring to the
> promotion of student thinking

In this study, gaining insights into the promotion of student thinking has been possible by employing a qualitative case study approach to encapsulate the efforts of six primary school teachers in the Auckland area. While this study focused on six individuals working in four different schools, many similarities emerged in the ways in which they rationalized the importance of promoting student thinking and how they interpreted this belief into their practices. Furthermore comparison can be drawn from the evidence about the development of their professional knowledge in this area. However, disparities also emerged. This chapter analyzes the similarities and differences in relation to the relevant literature presented in Chapter Two.

The qualitative data results from the previous chapter provide insight into the research aims. Investigating the research aims requires an exploration of three research questions on which the discussion presented in this chapter is framed.

The research questions are:

1. Why do teachers believe that promoting student thinking is important?

2. How are teachers in New Zealand middle and upper primary schools consciously promoting higher levels of student thinking?

3. How have teachers interested in promoting student thinking developed their professional knowledge in this area?

RESEARCH QUESTION 1: Why do teachers believe that promoting student thinking is important?

An evaluation of New Zealand educational reforms reflects an adherence to an economic rationalization for the purpose of schooling and is evidenced in the language of curriculum documents such as *New Zealand Curriculum Framework (1993)* (Codd, Harker, & Nash, 1990; Fitzsimmons, 1997; Gordon, 1997; Olssen & Matthews, 1997; Openshaw, Lee & Lee, 1993; Peters, 1997; Snook, 1997; Thrupp, 1997). An economic rationale supports the belief that schools should focus on developing the skills necessary to prepare students for employment positions in the competitive global market. This research indicates that the teachers were indeed focused on their role in creating 'global' citizens, however their comments indicate a more comprehensive view of global, taking all the different aspects of one's life into account. Only one teacher, Teacher C commented on economic factors when discussing his/her rationale for promoting student thinking. Early in Teacher C's interview, a reference to the 'world of work' was made regarding the importance of promoting thinking. However, subsequent comments and the classroom observation reflected a larger emphasis on the social and personal developments of the students rather than their contributions to the national economy.

Despite the New Right's market intentions, the teachers in this study upheld Dewey's and Grundtvig's belief in liberal education that fosters a desire to learn as discussed by Goodlad (1997) and O'Neill (2000). The prominent reason for promoting student thinking given by every single teacher was the holistic importance of developing the cognitive and metacognitive abilities in their students. 'Holistic' entails involving all of something, including the physical, mental and social aspects of learning and development. Teacher A remarked in the interview that the type of thinking s/he was consciously promoting in the classroom emphasized the development of self-respect: "firstly, to value themselves...then from that you must come to be able to value other people...you can't value *anything* until you start with yourself". With firm opinions, Teacher A's holistic views were very strong and s/he made no indication of support for the economic rationalization ideology that New Zealand's educational policy makers intended. Yet Teacher A wholly supported the Essential Skills component of the *New Zealand Curriculum Framework (1993)* remarking, "I'd like to throw away all the other documents and just use them [Essential Skills] and thinking skills". Previous to

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this statement Teacher A said, "To be a good citizen is the most important thing for me," reflecting the democratic rationale that is often aligned with lifelong learning.

Both Teacher C and F commented on the relevance of the most recent curriculum document, Health and Physical Education (1999) in promoting student thinking. This document supports Teacher A's previous statements with a focus on enabling students to develop "the knowledge, skills, attitudes and motivation to make informed decisions and act in ways that contribute to their personal well-being, the well-being of other people, and that of society as a whole" (Ministry of Education, 1999, p. 6). Relationships are a component of a liberal education and significant in every facet of society: personally, politically, economically, culturally, and socially. Developing and maintaining relationships was a specific focus of this curriculum and represented in the third of its four sections - Strand C: Relationships with other people.

Each teacher discussed the importance of relationships during their interviews. Hearing other points of views and issues related to conflict resolution were prominent themes that contributed to growth in this area. The teachers' encouragement, acceptance, and value of others' viewpoints facilitated the inclusion of wider perspectives in thinking. Each teacher supported Eggen's and Kauchak's (1999) strategies for dealing with diversity: an attitude of acceptance, positive expectations, and valuing the uniqueness of the learner. The cooperative learning environments where teachers and students collaborated to achieve an understanding supported the focus on relationships that each teacher emphasized.

In their daily lives, children deal with complex issues that some adults may consider too difficult for them to analyze. War, death, money and religion were topics explored in some class observations. Promoting student thinking provides students with the tools to critically evaluate complex topics. While the discussion on war was initiated by Teacher C's lesson, children often prompt consideration of deeper issues in their discussions. The students in Teacher B's class demonstrated this by initiating a discussion about the value people place on money. Choosing to grapple with such a complex topic evolved directly from the thoughts and remarks of the children, not the teacher.

The classroom can offer a safe environment to practice and refine the abilities needed to address the complex issues that arise in everyone's life. Teaching children the thinking skills that will allow them to analyze important issues and form their own opinions can begin in primary school. Teachers' efforts to facilitate these abilities were recognized as having relevance to *all* children supporting the assertions of Azuma (1991), Bloom (1985), Cathcart (1994), Costa (1991), Fogarty (1998), and Renzulli (1986). Though Teacher B was most recently teaching in a GATE class, the majority of his/her eighteen years of teaching experience was not spent teaching children who had been specially grouped. This teacher believed that the children in the GATE class represented "a special needs group".

Thinking skills permeate multiple areas of life, therefore a focus on promoting student thinking for holistic reasons including the development of the child cognitively, socially, and emotionally provides a union between the various rationales behind the purpose of education. Lifelong learning as the primary platform can support economic and democratic advancements. Costa and Liebmann (1997) elaborate:

> We believe that the purpose of education is to enhance and develop the natural tendency of human beings as meaning makers. Humans' curiosity is aroused as we search for meaning behind ambiguous principles and concepts. It is this continual search that promotes technological as well as personal advancements (p. xviii).

Responding to the interview question 6: *What is your philosophy about teaching and learning?*, Teacher B summarized the viewpoints of the other teachers by stating, "to inspire the children with a love of learning for the rest of their lives". This last statement appears to be the chief motivator in answering the first research question for the participating teachers.

RESEARCH QUESTION 2: How are teachers in New Zealand middle and upper primary schools consciously promoting higher levels of student thinking?

By combining data from the self-assessments and the interviews in order to analyze how teachers in New Zealand Year 3-6 classes are consciously teaching thinking, the researcher examined each teacher's 'espoused theory-of-action' (Argyris, 1991). The self-assessments and interviews provided data to also better understand their beliefs,

attitudes, backgrounds, and professional development experiences. Argyris (1991) contrasts what people say they do with what they actually do by also examining each person's 'theory-in-use'. This section examines the teachers' promotion of student thinking and highlights any dichotomies between their 'espoused theories-of-action' and their 'theories-in-use'.

Promoting student thinking requires not only instruction in thinking skills but also the creation of a culture for thinking. In the review of literature, Beyer (1998), Fogarty & Bellanca (1991) Marzano and colleagues, (1988) and Perkins (1993) suggest that in creating a thinking culture four elements must exist and interact. The elements that frame this culture include the provision of a safe classroom climate where risk-taking is encouraged, explicit skills instruction, collaboration through guided interactions and support, and metacognition. Examining how the teachers in this research interpreted the promotion of student thinking will be discussed with a consideration of these four approaches in creating a thinking culture. As mentioned in previous chapters, the complexity of features related to promoting student thinking denotes that many of the aspects are inter-related and cannot be categorically labeled.

A Safe Classroom Climate

The holistic perspective to teaching shared by all these teachers and their focus on relationships complemented the existence of a safe classroom climate. Beyer's (1998), Fogarty's and Bellanca's (1989) beliefs in the importance of creating a climate of respect and value for each other was depicted in the strong emphasis on listening and sharing viewpoints. Through modeling by the teacher and the students it appeared that there was the perception that they could *all* learn from each other. On the self-assessment scales, listening was strongly indicated as an activity that teachers planned for regularly. The validity of these responses was supported by data from the interviews and observations. Time was given for many children to share their ideas, encouraging the value of their contributions, rather than seeking one particular answer.

In each classroom, the teacher and students expected explanations for reasons to be proffered or given in response to prompts. Teachers and students questioned each other in order to achieve a better understanding of comments made or questions asked. This clarity of thought was promoted through a focused use of specific terminology.

Attempts to avoid misunderstandings lessened the possibility of frustration. By creating a shared understanding, the core of the issues could be more accurately discussed and challenged.

Sharing ideas can be difficult in environments where people are not respectful of each other. The teachers in this study fostered respect and value for each other by utilizing a variety of strategies. Teachers D and F explicitly referred to teaching children how to give constructive criticism and Teachers A, D, E, and F referred to using "I" statements in conflict situations. Lipman (1991) and Beyer (1998) discuss the negative impact that can result from giving a 'wrong' answer. However sharing an idea or an answer that could be 'wrong' was acceptable in each classroom because the learning experiences emphasized the process and not the answer. Mistakes were part of this process and 'OK' to make.

Risk-taking was encouraged in these learning environments and students felt comfortable challenging each other's ideas. Challenging issues often involves considering different points of views and this was an approach seen in the classrooms of Teachers A, B, C, and F. Challenging each other's ideas was an expectation that five out of six teachers said they believed occurred 'often' in their classrooms. No teacher responded *very often* to self-assessment statement 18: *I expect students to challenge each other's ideas in the classroom.* This may be because creating an environment in which ideas are challenged and students feel safe requires a delicate balance. However when the *issues* are challenged rather than individual students, both concepts can exist in harmony.

Explicit Skills Instruction

The teachers believed in the necessity of directly teaching specific thinking skills and then integrating them into subject area. Though the researcher's interview question: *Why do you think the direct teaching of thinking skills is valuable?* revealed a bias towards incorporating elements of direct instruction into the learning program, the researcher does not accept the simplified view of choosing between direct thinking skills instruction or infusion into the subject area. Like Beyer (1998), the researcher believes "we can and should teach thinking skills and subject matter at the same time" (p. 137). Skills can be explicitly taught in isolation but without relevance to content

they would be devoid of meaning and usefulness as Maclure elaborated in the introductory pages of *Learning to Think: Thinking to Learn (1991)*. Additionally, if students are not aware that they are using a thinking tool then they are less likely to be able to utilize it in other areas. This lessens the students' abilities to transfer their repertoire of thinking strategies into other subjects and areas of life outside the classroom.

A wide range of tools was used to teach explicit thinking skills indicating that one method is not the only approach or even the 'best'. Every teacher, however, used graphic organizers which are prevalent in many teacher resource books. Some curriculum support documents give examples of their use in the specific subject area. For example, the social studies curriculum support binders by Kelvin Smythe have a sizeable collection of graphic organizers in Book 1 (1995). Integrating explicit thinking skills instruction into the content as Teacher D professed reflects Pogrow's (1997) solution to the process versus content debate by using a "process approach to teaching and learning that actually increases the learning of content" (p. 98). The Curriculum Integration contract that Teachers B's and F's school was involved in targets the use of graphic organizers in its professional development. Many people see and use graphic organizers in their personal lives, and the teachers' familiarity with them may also account for their prevalence.

Some thinking tools were expected to be utilized school-wide as in the case of Teacher A's and D's use of the Six Thinking Hats. Additionally Teacher A's and D's school dedicated one term each year to student-generated investigations supported by Gawith's Action Learning program. Their school has a major information technologies focus and the new technologies bring vast amounts of information to the user, therefore it would be interesting to compare the efforts to promote student thinking between schools with and without strong information technology emphases. The awareness of preparing students with the ability to critically analyze in the 'information age' may have influenced a schoolwide commitment to thinking. McKenzie (1997), Fullan (2000) and Melchoir, Gawith, Edwards & Keany (1997) endorse the necessity of developing better thinking skills to deal with the increased information that technological advancements provide us.

Teacher C's school promoted a multiple intelligence philosophy in their learning environments but no other schools seemed to require the use of particular thinking tools, leaving the decision up to the discretion of the individual teachers. Because learners can benefit from learning experiences involving a range of thinking tools, a wide professional repertoire increases the likelihood of more than one tool being utilized in the classroom. Only Teacher F indicated an unawareness of what thinking tools were though examples of their use emerged in the interview and were evident on the walls in the classroom.

A less formalized tool, but no less important, was the tool of questioning. The teachers in this study readily utilized higher levels of questioning that often begin with the 'how' or 'why' stems. However, higher-level student questions remain an area for continued development. McKenzie and Davis (1986) remind us of the power of the question but show concern about the apparent lack of student-created questions that represent higher cognitive levels. Together they authored *Filling the Tool Box: Strategies to Engender Student Questioning (1986)* to facilitate students playing active roles in their learning through questioning. McKenzie (1997a & 1997b) has included this as part of a "questioning toolkit" published in his online journal *From Now On*.

O'Brien chose the subject of questions as his first statement on the teacher self-assessment scale, thereby showing the priority he gave to questioning. Statement 1 says: *I ask students to explain the reasoning behind their questions*. While all teachers responded *often* with the exception of Teacher A choosing *very often*, this was not evident in the observed lessons or interviews. In fact, only Teacher A and D presented lessons emphasizing students' generated questions. Yet an expectation for reasons behind *statements* but not *questions* was prevalent in observed lessons. It is plausible that the teachers could have misinterpreted their response to self-assessment statement 1 by considering the reasoning they expected students to give for opinions and comments made in class rather than questions. However, clarifying the reasons behind questions involves metacognition. The observations failed to reveal many activities that demonstrated what Perkins refers to as the reflective level of metacognition. The significance of explaining reasons behind questions corresponds with the metacognitive traits of articulating one's own thought processes. Following the section on collaborative interactions, metacognition is discussed in more detail.

Collaborative Interactions

Constructivism is a philosophy for teaching and learning that relies on collaboration as children work to create meaning. Constructivism exists in many New Zealand classrooms and is strongly reflected in the national science curriculum. Fundamental to constructivism is the students' prior knowledge. Every teacher observed linked the lesson to the prior knowledge or experiences of the children thereby bringing more meaning to the lesson. However, as Windschitl (1999) points out, ideologically creating a constructivist classroom appeals to many teachers but practical considerations often present barriers. The reality of supporting a constructivist classroom is 'challenging'. In "The Courage to be Constructivist," Brooks & Brooks (1999) also reflect the difficulties inherent in constructivism but maintain its necessity because, "Students must be permitted the freedom to think, to question, to reflect, and to interact with ideas, objects, and others – in other words, to construct meaning" (p. 24).

Every teacher discussed activities that indicated the frequency of cooperative and/or peer learning methods in their classrooms though not all observed lessons demonstrated this. Cooperative and peer learning activities rely on communication and interdependence to be successful as Slavin (1991) has discovered through his extensive research. However, cooperative learning is also misrepresented at times. Some teachers believe a particular activity is cooperative because the children are working in a small group, yet further investigation reveals that though the children are physically placed in a small group, they are each working on independent activities. This misunderstanding was not evident in any classrooms as interdependence was observed in every lesson with children working in small groups. Teacher B and D presented whole class lessons for observation.

Already established in each classroom was a sense of respect for each other's ideas and opinions. Cooperative and peer learning is successful only in classrooms with collaborative environments. Modeling is frequently a part of these environments and critical for teaching thinking, as demonstrated by the foundational research of Vygotsky (1978) and Feuerstein (1980). Costa and Kallick (2000) support its value in reflection, "models of reflection give students images to mirror" (p. 62). While teachers are often models, student modeling allows the talents of the children to be

celebrated and encouraged in others, as well as placing a value on what can be learned from each other. As models, students are actively engaged in the process of learning because they are placed in a position of teaching and explaining a concept. This activity requires higher cognitive functions and as Sternberg (1987) reminds us, "it has often been said that there is no better way to learn than to teach" (p. 459). In the researched classrooms, both teacher and peer modeling occurred.

Teacher A's lesson demonstrated cooperative ideals because each member had a different role connected to the main objective: developing oral language through news reporting. It was obvious that the group members valued each other and were comfortable working together, a goal of collaboration that takes time to achieve. Very little instruction regarding working together was given at the beginning of the observed lesson and the groups interacted conscientiously and cooperatively indicating that this practice was well-established in Teacher A's classroom. Teacher A organized and maintained the same cooperative groups from the beginning of the year and the development of their cooperative skills was ongoing, supporting Strother's (1985) remarks that successful teaching is linked to the teacher's actions in the first days of school.

Self-assessment statements 10: *I expect students to generate their own hypotheses* and 15: *I give students opportunities to investigate subject-related, self-generated problems* reflect constructivist ideals. However this is not the only similarity between these statements. Neither statement received a *very often* response from the teachers, yet *very often* was selected by at least one teacher on fifteen of the eighteen statements. One difficulty for teachers in having students generate their own hypotheses and problems is monitoring up to 35 investigations. The researcher suggests increasing professional development opportunities specifically targeted at managing the challenging aspects of the constructivist classroom, such as student-generated investigations. Pursuing all the investigations simultaneously places pressure on resources and time; therefore it is more conceivable to have groups of students investigating self-generated hypotheses and problems than the entire class. In cooperative environments, it is also feasible to have students investigating in pairs to alleviate practical obstacles to this constructivist ideal.

Metacognition

Metacognition requires thinking about *how* one's thoughts came about, thereby improving the ability to control one's thinking processes. By exploring 'how' a decision was made, the factors that influence choice can be identified and recognized. Metacognition is essential to bridging lessons learned in the classroom to the students' lives at home, in play and in their work as indicated by researchers and authors Barell, (1992), Costa and Kallick (2000), Costa and Liebmann (1997), Paris and Winograd (1990), Perkins (1992), Perkins and Salomon (1992), Swartz and Perkins (1990), and Winograd and Gaskins (1992). Metacognition facilitates this *transfer* and is critical to promoting thinking.

Reflection has an important role in teaching thinking because it requires careful consideration of previous acts, events or decisions. Critical for evaluation and an important part of the highest levels of metacognition, reflection provides the language and the practice for reconsidering issues. Reflection comprised an important element in many of the teachers' practice. Teacher C's entire lesson was reflective, asking the students firstly to reflect upon their own feelings related to the attacks of September 11, then upon the feelings of people other than themselves affected by the attacks, and finally upon their opinions about the war in Afghanistan.

Reflection requires that time is set aside to question and consider what was learned. Costa (2000) contends, "maximizing meaning requires reflection" (p. 60). Teacher C formally did this by gathering the class together for 'final comments' after their group activities. Teacher A involved reflection in the news reporting lesson by having children ask questions of the reporter to clarify the information reported. Teacher D also emphasized clarification of the information and asked intermittently for summaries of passages read. Teacher F discussed the meaning of the story as a reflective act and Teacher E summarized issues related to safety in the classroom by having each pair share one idea. The examples all support an element of Perkins (1992) reflective level of metacognition, yet *how* these understandings were derived and *how* they could be applied in future contexts was absent from every observed lesson (Costa, 2000). Metacognition at its highest level involves not only the ability to reflect but included is the ability to draw upon and revise cognitive strategies in the process of thinking to improve critical and creative outcomes.

Though not directly related to the observed lesson, Teacher A's students spoke reflectively about the importance of metacognition. They related many of their comments to the blue 'metacognitive' hat in de Bono's Six Thinking Hats program. Commenting, "When you want to do something, you know there's a sort of plan, a thinking plan to think it out and do it," one student displayed elements of the strategic and reflective levels of metacogntion discussed by Perkins (1992). The reflective level also includes the ability to ponder and revise cognitive strategies *in progress*. Teachers or students did not discuss this metacognitive process during the observations. While it is plausible that discussions about metacognition occur more often in other lessons, the noticeable lack of this important element in the reflective level of 'thinking about thinking' is worrying because of its importance in achieving transfer.

Metacognitive issues were discussed in varying degrees in every teacher interview but the great importance assigned to this process may not be as evident as desired. Each teacher understood that the observed lesson was to represent his or her efforts at promoting student thinking, yet the critical process of metacognition at its highest level was overwhelmingly absent. Metacognition must be specifically identified and fostered because it is not necessarily a 'by-product' of direct thinking skills instruction. Perkins and Salomon (1992) remind us of this in their Little Bo Peep theory of transfer – leave metacognition alone and it will not simply come 'home' when needed. Thus, the researcher's cause for concern is warranted. For these six teachers who are consciously promoting student thinking, metacognition appears to be an area for improvement through professional development, therefore most teachers would benefit.

RESEARCH QUESTION 3: How have teachers interested in promoting student thinking developed their professional knowledge in this area?

The personal commitment to promoting student thinking acted as a catalyst for each teacher to reflect upon their practices and investigate options for improving their teaching. Partaking in the research provided an opportunity for reflection. Each teacher took this opportunity seriously and provided detailed, thoughtful responses to the interview questions. Ironically Teachers C and E indicated that they *seldom* thought deeply about their teaching. Their *seldom* responses could be attributed to the issue of

time so many teachers struggle with in education today. With an overcrowded curriculum and a myriad of demands, reflection on the part of the children and the teachers can be pushed aside to accommodate 'objectives' that require assessment.

A school ethos of promoting student thinking did not prevail in all the participating schools but a personal commitment to this ethos did. However, the researcher recognizes that an element of support for the promotion of student thinking in all the teachers' schools could be argued; in order for teachers to fill in the self-assessment scale, permission firstly had to be granted by the school's administration, either the principal or Board of Trustees. However, as an *ethos*, a distinctive characteristic, results indicate that only the two schools in which Teachers A, C, and D were situated possessed this.

In the case of the remaining two schools, the researcher spoke only with the teacher(s) and she recognizes that this perception could be flawed. Creating an ethos demands the creation of a 'culture' and if strong enough all members should recognize their role in this community. The other schools were not devoid of support but it did not permeate the data. When Teacher B discussed her interest in promoting student thinking she reflected upon her experiences at other schools and then said, "…so the school does actually support it". However the two schools of concern had not developed a strong enough culture to become convincingly visible in the data.

Therefore the impact the school can have on creating an ethos that values the promotion of student thinking cannot be underestimated. King and Newmann (2000) reiterate the value of whole school professional development discussing how much stronger the effects are compared to that of professional development targeted at individual teachers. All decisions including professional development opportunities must be considered with this vision in mind.

> Most current educational settings neither labor very hard to build teachers' understandings of new instructional perspectives nor allow teachers the flexibility or freedom from the coverage fetish to pursue more enlightened instruction (Perkins, 1992, p. 52).

Teacher D illustrated this sense of professional flexibility and freedom remarking in the interview, "I don't worry about time because if something is worth doing, it's

worth doing right and that's more important to me than just skimming across". The school's vision must actively prioritize this belief for it to be successful, especially in a system that is overwhelmed with administrative tasks and accountability requirements. Even with school support, the difficulties can remain because change takes time. Reflecting on the Teaching for Understanding program, Unger (1994) remarked:

> With the typical demands of school – curriculum coverage, little time for reflection, and school calendars – we found ourselves shortchanging the potential for continuous self- and peer-assessment, for the sustained engagement in rich performances of understanding, and for focusing on generative topics that could be expanded across the entire curriculum. What we learned, nonetheless, is that the framework helped us put understanding "up front" (p. 10).

Teacher A and D indicated that their school had staff meetings committed to professional development in students' thinking skills. There was an expectation that various thinking tools like the Six Thinking Hats and Bloom's taxonomy of cognitive skills become a regular part of the classroom program. The use of these tools was included in the portfolios with informative descriptions to educate parents. Teacher C indicated a similar effort with journals to inform parents about strategies utilized in the promotion of student thinking. Parent education is an important step in elevating student thinking by bringing together the learning community in supporting the vision (Fullan, 2000).

When examining the development of the teaching participants' professional knowledge, the importance of the principal emerged. Teacher C remarked on constantly being challenged by the principal to consider results from recent literature. Teacher C's principal invited the researcher to a 'thinking' seminar that he was organizing. The school identified itself as embracing Gardner's theory of multiple intelligences and extension classes such as Lipman's Philosophy for Children were offered in support of including various methods for enhancing student thinking. Therefore the principal at Teacher C's school actively supports the 'thinking' vision. Teacher D referred to 'thinking' materials and staff meetings run by Teacher A, not the principal, demonstrating that the catalyst for this vision does not have to be the principal. However Teacher A specifically remarked on the principal's support and encouragement for teaching thinking exemplifying that the principal must support the efforts in order to make them a part of the collaborative thinking culture.

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Providing time to discuss the promotion of student thinking at staff meetings as Teacher A's, D's, and C's schools reflected a school vision that encouraged *all* staff members to consider their roles in facilitating higher levels of student thinking, rather than leaving this critical process to the realm of the individual teacher. By enculturating the entire school with a 'thinking' ethos, professional development opportunities between colleagues is possible through formal meetings and informal discussions in the corridors or staff room. Relevant literature can be shared and peer modeling can inform, allowing for powerful opportunities to exchange ideas. Professional development in promoting student thinking on the school level instead of only by individual teachers can also assist in minimizing the lack of knowledge referred to by Teachers D and F as an obstacle to their thinking efforts. Teachers A, B, C and E commented on time as an obstacle that prevented them from maximizing their efforts to promoting student thinking. Time issues can be more easily addressed when the entire school is focused on facilitating higher levels of thinking in the student body.

Multiple methods for reflection on teaching practices strengthen the efforts for development by providing a variety of information. The data from Teacher A's and B's self-assessments, observations, and interviews were consistent, however variations occurred in the others. For example, if the observation had been the only tool to assess the level of promoting student thinking in Teacher E's and F's classes, few examples, beliefs and ideas supporting this effort would have emerged. However, the self-assessment and interview data provided an alternative means of evaluating their interest, experience and attitudes towards promoting student thinking. Teachers E and F rated themselves more highly on the self-assessments than the observed lessons demonstrated, therefore supporting Argryis' (1991) notion of the theory-in-action not meeting the espoused theory-of-use. Utilizing various tools for reflection provides a more comprehensive profile of teaching practices, therefore contributing to specific professional development goals.

Peer support also comprises a crucial element when reflecting on teacher practice. It is the opinion of the researcher that Teacher D's self-assessment was too critical and therefore not an accurate reflection of his/her teaching practice. For example, Teacher D responded *seldom* to statement 13: *I expect students to think through the steps they will use to solve a problem before they write anything down* yet this occurred during

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the observed lesson. While this could have possibly been one of the few times Teacher D expected this, peer observation could provide ongoing constructive feedback which could assist in reflecting on teaching practices by providing alternative perceptions. Through collaboration in an environment where trust has been established, teachers can work together to improve their promotion of student thinking by offering honest, insightful feedback to each other.

SUMMARY

Lifelong learning emerged as the prime reason for promoting student thinking. The teachers believed facilitating higher levels of student thinking assisted in the holistic development of the students. A holistic perspective is inclusive of emotional, social, and economic security thus combining a variety of rationales for education. Therefore the focus on lifelong learning contributes to growth in all areas of a person's life.

A safe classroom climate and teaching explicit thinking skills emerged in the practice of all six teachers, yet the level of knowledge about various methods for teaching explicit thinking skills varied. Collaborative interactions existed to some degree in each classroom however the variances provided discussion points. Metacognition is an imperative process to develop in attaining the goal of transferring thinking skills learned in the classroom into real-life situations. While some students in Teacher A's class discussed metacognition at length and the topic was discussed by teachers during the interviews, no lessons demonstrated clear examples of teaching for transfer. Though the researcher acknowledges that one observation and an interview may not be sufficient to determine the frequency of teaching for transfer in the practices of participating teachers, this absence is of great concern because of its critical importance.

In the past, professional development has been "divorced from practice" and "generic" because programs have been created to work for all teachers, and "haphazard" because the opportunities have come from a range of providers each with their own particular interest (Willis, 2002, p. 6). Opportunities that are directly related to the teachers' practices represent a change from professional development in the past by shifting the emphasis to learning from the most successful teachers (Willis, 2002). National educational policies that reflected an ethos of promoting student thinking would

minimize the obstacle of time and lack of knowledge mentioned by the teachers in this study. In addition, overcoming difficulties in achieving curriculum balance could be assisted by a national focus because policy requirements made with this vision of consciously teaching thinking would conflict less often with accountability issues and curriculum demands than it does currently.

Chapter 6

Conclusions

The purpose of this research was to describe how and why New Zealand middle and upper primary school teachers promote student thinking. Promoting student thinking is a difficult phenomenon to 'capture' on written pages because this process is neither static nor easily measured. Teaching thinking does not simply involve incorporating a list of skills into the class program. Explicit skills instruction represents an important element of the effort but researchers Beyer (1998), Fogarty and Bellanca (1991), Marzano and colleagues (1988) and Perkins (1993) elaborate on other approaches necessary to create a thinking culture: the classroom climate, collaborative activities, and metacognition. Without this culture, the ability to transfer the thinking learned in class to situations beyond the classroom walls is difficult. The 'culture' assists in facilitating the dispositions that help *create* knowledge.

Data was gathered through qualitative, case study research because this design allowed for an *understanding* of the topic, rather than an explanation. The selection of the research methodology was influenced by the research's own constructivist philosophy. The three phases of information gathering: self-assessments, classroom observations and teacher interviews, provided the researcher with data that reflected the beliefs, practices and professional development backgrounds of the teaching participants. Though the teaching participants possessed varying degrees of experience and worked in a range of schools, similarities emerged in the ways they interpreted and implemented the promotion of student thinking.

Through a coded analysis of the three data sources, five common themes emerged in the teachers' efforts to promote student thinking: collaborative interactions between students and teachers as they listened, shared and challenged each others' ideas, questioning, the use of specific terminology, students taking an active role in their own learning, and reflection. These inter-related themes correlate with the four approaches thinking experts advocate to produce a culture of thinking in classrooms.

In promoting student thinking, this research shows that an emphasis on the process of learning is needed to meet the needs of students in today's rapidly changing world. In a 1995 interview, Peter Senge observed:

> You know, they used to say that school could teach somebody 80 percent of what they need to learn in their lifetime. Today that figure would probably be more like 2 percent. Schools need to focus on thinking skills and learning skills, because those are what will prepare kids for a world of increasing interdependency and increasing change (O'Neil, 1995, pp. 22-23).

Facilitating higher levels of student thinking encourages teaching for understanding. Therefore the process of thinking can increase the content learning relevant to the students' current needs and provide them with the cognitive tools to construct the meaning they will need in the future. The conclusions of this study are limited because of the small number of teachers interviewed, however they reflect many elements consistent with the reviews of the literature about promoting student thinking.

RESEARCH AIMS

This study achieved its three aims:

- to investigate why the teachers believe in the significance of promoting student thinking

- to examine what the teachers are doing to promote student thinking by investigating their teaching practices and the learning environments

- to provide descriptive examples of how New Zealand teachers in Year 3-6 primary classrooms are promoting student thinking

In the realization of the research aims significant results emerged, providing material for analysis. The six participating teachers were each at different stages in their knowledge about promoting student thinking. While this research does not purport that the practices of each teacher represent 'excellence' towards the goal of teaching thinking, each teacher does represent a concerned educator interested in the topic and making a conscious effort to facilitate higher levels of student thinking in his/her classroom. Leading to this investigation, the researcher shared a similar interest and efforts towards promoting student thinking in her classroom. In conducting the research, terminology, ideas and concepts have become more refined and

sophisticated, justifying any minor discrepancies between the final report and the initial correspondence located in the appendices.

IMPLICATIONS FOR TEACHERS

The climate in every researched classroom emphasized a sense of safety and observations of the interactions between students and teachers confirmed this. The safe climate may be attributed to the holistic development of the students that all teachers felt was important. This climate allows for ideas to be challenged, different viewpoints to be expressed and questions to be asked without fear of castigation. A safe climate facilitates and encourages the success of collaborative interactions between students and teachers. Working together the children could be involved in guided interactions that required the application of their thinking skills. Acting as mediators, both the children and the teacher can help students to recognize the most effective strategies to use during inquiry and problem solving. Using each other as role models, they could emulate successful patterns of thinking and realize that mistakes are part of the process and experienced by everyone.

Frequent interactions between teacher and child were evident in the data, however the frequency of cooperative and peer learning was difficult to assess and could be an area for future development for teachers interested in promoting student thinking. The strength of Teacher A's cooperative groups was a result of efforts that commenced at the beginning of the year and were the primary focus for six weeks. Teacher C's groups discussed a difficult topic with insight and respect for the opinions of others. The students in Teacher D's class questioned each other to consolidate comprehension of the text during the reciprocal teaching lesson. The interactions, though positive in Teacher E's and F's classes, did not exemplify lessons in which the children were actively helping to mediate higher levels of thinking. Teacher E's Think-Pair-Share lesson emphasized peer interactions but did not provide the opportunity for students to learn strategies from each other because it was an identifying or brainstorming activity. In Teacher F's lesson, the teacher questioned the students individually and the pupils did not specifically work together to achieve higher levels of thinking.

Further development in strategies such as cooperative and peer learning could advance the efforts of primary teachers to promote the cognitive and metacognitive abilities of

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their students. The constructivist approach to teaching and learning advocated by thinking experts exists cohesively with cooperative and peer learning strategies. While constructivism is a philosophy supported by educators in New Zealand, the practice can be difficult and challenging. Therefore, sharing successes in constructivist teaching practices would benefit most teachers.

Teachers in this study were successfully promoting student thinking in many ways. The climate, the collaboration and the specific skills instruction were integral parts of each classroom. Though each area could be developed further, it appears the area most in need of professional development opportunities is that of metacognition. The issue of metacognition is complex and cognitive scientists, educational psychologists and brain researchers are continually discovering more. However, the importance of metacognition in transferring skills from one context to another has already been uncovered. Perkins' and Salomon's (1992) research tells us that transfer does not naturally 'happen', therefore the focus upon teaching students about their own thought processes in an effort to be able to control them is paramount. An emphasis on metacognition resonated throughout the teachers' conflict resolution examples and mention was certainly made of it in interviews, yet the observations provided only one strong classroom example of metacognition. The highest level of metacognition requires reflecting on how one arrives at a decision or 'answer' so that thinking strategies can be revised for better understanding. Reflection emerged from the data but a focus on revising and drawing upon a range of thinking strategies did not, therefore the frequency of this element of metacognition appears to be limited.

Metacognition is an important ability for teachers to develop as well as students. All teachers included metacognition in their practice but variances occurred in how often they consciously engaged in 'thinking about thinking'. The self-assessment responses indicated a large difference in the frequency of the teachers' personal reflections on promoting student thinking ranging from *very often* to *seldom*. By participating in this research, the teachers embarked on metacognitive exercises, explaining their processes of teaching, reflecting on how their teaching practices had developed, and giving reasons supporting their efforts to promote student thinking.

The teachers, while having a critical influence, do not have the only influence on the establishment of these approaches. Parents and families have a powerful impact on

children's development. The influence of the school is also vital to creating long-lasting affects in the student body. Beyond school policies are national educational policies impacting the instructional process and content. Capable of positive and negative impacts in education, parental, school and national influences affect the efforts of teachers interested in promoting student thinking.

IMPLICATIONS FOR SCHOOLS

A school vision is critical if the goal of promoting student thinking is to be achieved beyond one classroom. Enculturating the entire school with the vision of teaching thinking provides a powerful platform on which teachers can discuss, experiment with and reflect on strategies that will increase the level of their students' cognitive and metacognitive abilities. The culture takes time to establish and resistance is sure to come from some members but strong leadership, professional development and collaborative efforts can facilitate this goal.

The principal's role is critical. In the data from Teacher A, C and D, the efforts and the motivation of the principal towards achieving a thinking culture reverberated. Allocating time for professional development at staff meetings, incorporating the expectation of creating this culture in the classroom, and sharing topical resources were efforts by the principals described by the teachers. Yet, it does not have to be the principal him/herself who is the primary thinking 'expert' on the school site. As in the case of Teacher A's and D's school, the principal's support was obvious, yet the on-site 'thinking expert' appeared to be Teacher A. Through collaborative efforts such as this example, the onus is not on the principal to upskill the staff or to be the 'expert', but to facilitate an environment where every staff member strives to become a thinking 'expert'.

Until the government provides more support in this critical area, the principal's role is even more important. The principal establishes a school climate where teachers feel safe yet are encouraged to take risks. It is the principal who facilitates opportunities for independent and peer reflection through structuring creative uses of time, teams of responsibility, and approaches to professional development. It is the principal who ensures that a platform for community involvement exists. It is the principal who ensures decisions are made with the school vision in mind. It is this vision that will

shape the focus of the school and the interpretations of national educational policies in the 'self-managed' school. Yet all responsibility does not rest solely with the principal.

IMPLICATIONS FOR THE GOVERNMENT

Reform policies dominated the educational landscapes of many nations during the 1980s and 1990s and New Zealand did not escape this trend. The educational change initiated in the late 1980s and through the 1990s had New Right ideals that dramatically changed schools. The New Right ideology affected educational environments with its 'market' emphasis on self-management, efficiency and accountability. Yet schools have struggled to meet these market demands, and teacher and principal workloads have increased dramatically under these policies and procedures. The overall affect has been a combination of self-management and state-run requirements, and a widening gap between socio-economic groups. Put in the position of being 'competitor' in the education 'market', some principals and teachers have been reluctant to share and discuss 'best' practices. Yet collaborative efforts are gaining more support. The six teachers in this study possessed a rationale for education that greatly differed from economic rationalization reflected in New Right government policies. The purpose of education described by the teachers in this investigation centered on the growth of well-balanced individuals who were capable of developing and maintaining meaningful relationships.

In recent years, the Ministry of Education has developed contracts that are assisting the efforts to promote student thinking. Schools must commit substantial time and focus to these contracts in which opportunities for reflection are integral components. As part of some contract initiatives, members of schools come together during professional development workshops to share the results of the contract adoptions in their schools and make professional contacts with peers outside their own educational settings.

The new mathematics contracts, the Early Numeracy Project and the Advanced Numeracy Project, strongly emphasize developments in the understanding of number by focusing on the processes and strategies used to problem solve. Powerfully linked to metacognition, the strategy focus asks students to articulate their thought processes as they solve a problem. Other contracts also contribute to the promotion of student thinking. Contracts such as Curriculum Integration encourage and assist teachers in

creating learning environments that more closely related to reality where subjects combine to reflect our complex and dynamic world. Integrating subjects facilitates a deeper understanding and allows more flexibility of time that is difficult to locate in crowded curriculums. While contracts like these are an excellent beginning, they are only just that – a beginning. These programs have limited spaces and some schools that would like to participate remain on waiting lists.

The demands of self-management and accountability have lessened the precious time teachers and principals have to focus on teaching and learning. Though the contracts are promising, lack of time and curriculum overload are recurring complaints from primary schools. With the vision of promoting higher levels of student thinking in the classroom, the government can certainly do more.

RECOMMENDATIONS TO PROMOTE STUDENT THINKING

Speaking from the platform of this research, the following recommendations to promote student thinking are directed at teachers; however, it is hoped that schools and government policymakers will also pay heed.

- Identify and celebrate best practices. Teachers have a wealth of professional knowledge to share. A discussion platform from which the voices of teachers can be heard can facilitate teachers learning from teachers.

- Examine the current teaching and learning situation. Which activities and efforts support the promotion of student thinking? Which create obstacles? Initiate change.

- Include opportunities for parents to become informed and supportive of this vision.

- Collaborate with the school community and other educational institutions. Many schools have probably already implemented some innovative ideas to facilitate higher levels of thinking. A wider range of possibilities can come from working with others and collaborative efforts can be beneficial for all learners.

- Develop process goals to give students the tools they need to become independent, lifelong learners. Emphasize the Essential Skills by assigning them the same priority as the Essential Learning Areas.

- Prioritize authentic assessment where the process and product are evaluated. For example, have students record their thinking or their plan of action before, during, and after the creation of the product.

- Focus on moving students from the tacit, unaware level of metacognition to the highest, reflective level. Teach them the tools to explore their thinking processes so they can develop and choose from a range of strategies. Facilitate the ability for students to reflect on the effectiveness of their thinking and revise their strategies to create a deeper understanding. Explore your own metacognitive processes.

- Use thinking tools in your personal and professional life.

- Examine your own learning processes by reflecting on how you learn best while helping students to develop their cognitive and metacognitive abilities.

- Increase your professional readings and become a teacher-researcher to ensure that your espoused theory-of-action matches your theory-in-use.

SUGGESTIONS FOR FUTURE RESEARCH

The sample size of this investigation was small in both the number of participating teachers and the geographical location. Future research could expand a study such as this to include a greater number of teachers interested in promoting student thinking in order to analyze similarities and differences. The researcher recognizes that only one perspective was investigated in this study. Though two teachers from two schools participated, further research could include the perspectives of principals and more teachers working in the same school. Through cross-analysis the vision of the school in promoting student thinking could be examined. Gender and cultural factors were not a part of this study, though there is an influence. For example Azuma's cross-national research indicates cultural differences in the type of information gathered when making decisions. Therefore continued research might investigate underlying

rationales, the practices of teachers consciously promoting thinking, and professional development opportunities with consideration of gender and/or ethnic origins. The researcher supports the notion of inclusion because a wider range of perspectives offers a robust platform on which to examine cognition and metacognition.

Comparative studies examining rationales, influences and practices with other countries might reveal information that could be incorporated into New Zealand educational decision-making both to promote success and avoid repeating similar failures. Because O'Brien's teacher self-assessment scale is relatively new, there is a lack of comparative research specifically using this tool. Minstrell's discussion in "Teaching Science for Understanding" links cognitive research and science education, illuminating results relevant for any teacher interesting in promoting student thinking. However, research projects such as Harvard Graduate School of Education's Teaching for Understanding Project and Baird's PEEL project represent a link between facilitating higher levels of student thinking and a school vision.

CONCLUDING REMARKS

These findings are not limited to primary school teachers. Though the role of teachers in other educational settings varies, especially in relation to the number of hours per day students spend in teachers' different learning climates; there is no variance on the importance of thinking. As Perkins (1992) reminds us, we have to teach what we want them to learn. The research presented here offers reasons to rejoice, reasons to cry and most importantly reasons to reflect on the actions in the classroom as an inspiration and a catalyst for change to ensure that the cognitive and metacognitive potential in all children is realized.

In the last stanza of John Edwards (1999) piece, *The Things We Still from Children* he ponders over many elements discussed throughout this research:

> *For if they*
> *have never experienced being challenged in a safe environment.*
> *have had all of their creative thoughts explained away.*
> *are unaware what catches their interest and how then to have confidence in that*
> *interest.*
> *have never followed something they are passionate about to a satisfying conclusion.*

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have not clarified the way they sabotage their own learning.
are afraid to seek help and do not know who or how to ask.
have not experienced overcoming their own inertia.
are paralysed by the need to know everything before writing or acting
have never got bogged down.
have never failed.
have always played it safe.
How will they ever know who they are? *(p. 5)*

Learning is a process that involves cognitive and metacognitive activities in an environment that is safe, collaborative, and teaches thinking skills explicitly. This research has emphasized the critical importance of promoting student thinking by combining relevant literature with an examination of the rationales, practices and professional development experiences of six primary school teachers in the Auckland area. The researcher does not claim that the participating teachers represent the most successful teachers in this field but she does wish to celebrate their efforts. Some of these teachers have just recently embarked on their journey and others have traveled down this path for years. These teachers are special. They are special because they are interested in and believe in the promotion of student thinking. Think of how powerful the effect would be if the entire nation worked towards this vision instead of just individual teachers!

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Appendices

Appendix A Promoting Student Thinking J.O'Brien's Teacher Self-Assessment Scale: Phase One

PROMOTING STUDENT THINKING
J.OBRIEN'S TEACHER SELF-ASSESSMENT SCALE

Name: _____   School Phone No.: _____

School: _____   Home Phone No. (optional): _____

Year Level: _____   Number of students in the class: _____

Please note that it is assumed that filling in this questionnaire implies consent. You have the right to decine to answer any questions. All information will be treated with the strictest confidentiality.

Instructions

On the other side of this page are statements that describe various aspects of classroom teaching. Each statement concerns the teacher.

Choose the answer for each statement which you think is an accurate assessment of that aspect of your classroom teaching. It is suggested that you keep one of your typical lessons in mind as you respond to each of the statements.

Please do not indicate what you would like to be, but how you see yourself at this time. There are five possible answers for each statement. Indicate your response to each statement by placing a tick (✓) in the appropriate box. There is an example below.

a) When teaching in a classroom I stand at the front of the room	*Very often*	*Often* ✓	*Some-times*	*Seldom*	*Never*

If you make a mistake, simply scribble over the mistake, and indicate your corrected response with a tick as indicated above.

Thank you for giving you time to responds to the statements. Your sharing of your experiences is very much appreciated. All responses will be treated with complete confidentiality.

Please turn over this sheet and complete the self-assessment scale.

PROMOTING STUDENT THINKING - TEACHER SELF-ASSESSMENT SCALE

Statement	Response				
1. I ask students to explain the reasoning behind their questions.	Very Often	Often	Some-times	Seldom	Never
2. I provide time for students to reflect upon each other's ideas and strategies.	Very Often	Often	Some-times	Seldom	Never
3. When I plan lessons I plan what thinking the students will be required to use.	Very Often	Often	Some-times	Seldom	Never
4. I discuss with students the types of reasoning that are needed to complete a set task.	Very Often	Often	Some-times	Seldom	Never
5. I encourage my students to explore for questions rather than to search for answers.	Very Often	Often	Some-times	Seldom	Never
6. I consistently use specific terms to describe the different types of thinking used in the classroom.	Very Often	Often	Some-times	Seldom	Never
7. I plan opportunities for students to actively listen to each other.	Very Often	Often	Some-times	Seldom	Never
8. I help students to reflect on the thinking processes they use.	Very Often	Often	Some-times	Seldom	Never
9. I encourage students to look for more than one answer to a question.	Very Often	Often	Some-times	Seldom	Never
10. I expect students to generate their own hypotheses.	Very Often	Often	Some-times	Seldom	Never
11. I make time to think deeply about my teaching.	Very Often	Often	Some-times	Seldom	Never
12. I discuss with my colleagues how to challenge students to use higher order thinking skills (eg. analysis & synthesis).	Very Often	Often	Some-times	Seldom	Never
13. I expect students to think through the steps they will use to solve a problem before they write anything down.	Very Often	Often	Some-times	Seldom	Never
14. I have students use some graphic representation (eg. concept mapping) to summarise their thinking.	Very Often	Often	Some-times	Seldom	Never
15. I give students opportunities to investigate subject-related, self-generated problems.	Very Often	Often	Some-times	Seldom	Never
16. I expect students to be active participants in designing their own learning.	Very Often	Often	Some-times	Seldom	Never
17. I encourage students to like the challenge of difficult problems.	Very Often	Often	Some-times	Seldom	Never
18. I expect students to challenge each other's ideas in the classroom.	Very Often	Often	Some-times	Seldom	Never

Appendix B   Information Sheet for Principals

Information Sheet for Principals

My name is Jill Laursen.

I am in the process of undertaking my thesis to complete my Master of Education degree at Massey University. The aim of the research is to investigate suggestions for the successful infusion of **thinking skills** in Year 4-6 classrooms in New Zealand made by primary teachers who are consistently and consciously **promoting student thinking**. I have chosen this topic because the move from the Industrial Age to the Information Age, positions **thinking skills** as critical to success in this 'new' world. While many suggestions and ideas related to the best way to teach thinking skills circulate, there are New Zealand primary classrooms experiencing success in this arena every day. The New Zealand curriculum is overloaded and it is difficult to find clear guidelines about how to teach thinking, yet many teaching professionals are very adept at teaching thinking skills in their classrooms. I would like to **identify** and **celebrate these successes** by looking at their practice and providing research that investigates suggestions for the successful infusion of thinking skills in Year 4 - 6 classrooms. Becoming aware of **successful methods of teaching thinking** combined with reflection upon their own methods of teaching thinking, empowers teachers to make immediate strides towards a more cognitive approach to teaching and learning.

Information about this research has been distributed to numerous schools in the Auckland region. With your approval and that of your school's Board of Trustees, Year 4- 6 teachers in your school will have the opportunity to partake in this study by filling out O'Brien's teacher self-assessment scale on the promotion of thinking in the classroom. The teachers will then return the self-assessments in the envelopes provided to maintain their confidentiality. I will analyze the individual responses which will be completely confidential and ask 10 teachers to allow me to audio or video record 1-3 classroom lessons that reflect the promotion of thinking skills as indicated on the self-assessment. If the teachers would rather record their own lessons, provisions can be made for this alternative. Because the teacher promotes thinking through his/her lessons in the classroom, participation in this research will not cause any significant disruption to the learning environment. I will transcribe these lessons and ask six teachers to partake in oral interviews to be arranged at a time convenient for each individual. The interview questions and discussions will be related to the teachers' suggestions for promoting thinking in New Zealand classrooms. It is envisaged that each interview would take about an hour. The interview would be audiotape recorded, transcribed and again returned for approval. While it is necessary to obtain consent from students that may be recorded and their parent/guardian, the focus is not on the children, rather the teaching.

All student, school and teacher names will remain confidential. I will make every endeavour to protect anonymity by utilising pseudonyms and avoiding contextual references that could result in the identification of the teacher, the students or the school. It is impossible to give an *absolute* guarantee of anonymity and confidentiality when information is being recorded but I will protect participants to the full extent allowed by the law. All participants will have the right to withdraw at any point. They

will have the opportunity to read the final report before it is submitted and if they believe anonymity has not been protected the text will be altered to ensure that the final report maintains the anonymity of all participants. All materials will be destroyed at the end of the research process and consent forms will be held by the researcher in a locked drawer for three years from the date of publication. The findings of the research will be presented for assessment in fulfilment of the requirements for my Master of Education; copies of the thesis will be bound and placed in the Massey University library. The results may also be used for further professional development of teachers. A copy of the research will be provided to your school upon request.

In this information packet, I have included:

- 4 – 8 copies of the information sheet for teaching participants attached to 4 – 8 copies of the O'Brien self-assessment scale
- 4 – 8 envelopes addressed to the researcher (myself)
- one copy of the information sheet for teaching participants: Phase Two and Three
- one copy of the teacher consent form
- one copy of the information sheet for parents of student participants
- one copy of the information sheet for the student participants
- one copy of the consent form for student participants to be signed by both the student and parent/guardian

If you and the Board of Trustees agree to have members of your staff participate in this study, please distribute the information sheets with the attached self-assessment scales immediately and I will await the teacher's responses. Because each school operates in slightly different ways, I am looking to the principals, as members of the Board of Trustees, to be the liaison for approval before the surveys are distributed to teachers. I am very happy to attend a Board meeting to present this research for approval if you believe this to be the best for your school. I will ring your school to determine whether or not you are interested in participation in order to determine whether I need to contact more schools to ensure an adequate number of responses.

If you have any questions in relation to this study, please feel free to contact me at (09) 489 – 6339 (work) or (▮▮▮▮▮▮▮▮)(home). You may also contact either of my supervisors, Teresa Ball at (06) 356 – 9099 extension 8770 or Roger Openshaw at (06) 356 – 9099 extension 8847, Massey University.

Thank you for your time.

Sincerely,

Jill Laursen

Appendix C   Information Sheet for Teaching Participants: Phase One

Information Sheet for Teaching Participants: Phase One

My name is Jill Laursen.

I am in the process of undertaking my thesis to complete my Master of Education degree at Massey University. The aim of the research is to investigate suggestions for the successful infusion of thinking skills in Year 4-6 classrooms in New Zealand made from primary teachers who are consistently and consciously promoting student thinking.

As a participant you will complete a self-assessment ascertaining your current level of promoting student thinking in the classroom. Identifying data such as your name and year level and school will be on each self-assessment so that I may possibly contact you to ask your participation in Phase Two of my research. A self-addressed stamped envelope is included with each self-assessment so that you may personally post the questionnaire back to me. I will analyze the individual responses, maintaining complete confidentiality and ask 10 teachers to participate in the next phase. In Phase Two, I would like to audio or videotape 1-3 classroom lessons that you believe reflects the promotion of thinking skills as indicated on your self-assessment. If you would like to record the lessons yourself, I can provide the equipment and we can arrange a time suitable to you. The aim is to make this as easy as possible on you and your students. Participation in this research should not cause any disruption to the learning environment because I will ask you to choose 1-3 of your 'regular' lessons that reflect the promotion of thinking skills. I will transcribe these lessons and ask six teachers to partake in oral interviews to be arranged at a time convenient for each individual. The interview questions and discussions will be related to the teachers' suggestions for promoting thinking in New Zealand classrooms. It is envisaged that each interview would take about an hour. The interview would be tape recorded, transcribed and again returned for approval.

All student, school and teacher names will remain confidential. I will make every endeavour to protect anonymity by utilising pseudonyms and avoiding contextual references that could result in the identification of you, your students or your school. It is impossible to give an *absolute* guarantee of anonymity and confidentiality when information is being recorded but I will protect participants to the full extent allowed by the law. You have the right to withdraw at any point up until the report is written. You will have the opportunity to read the final report before it is submitted and if you believe anonymity has not been protected the text will be altered to ensure that the final report maintains the anonymity of all participants. All materials will be destroyed at the end of the research process and consent forms will be held by the researcher in a locked drawer for three years from the date of publication. The findings of the research will be presented for assessment in fulfilment of the requirements for my Master of Education; copies of the thesis will be bound and placed in the Massey University library. The results may also be used for further professional development of teachers through courses or other publications such as journal articles or excerpts in books.

I have attached the self-assessment questionnaire. If you would like to be part of this study, please fill in the attached form and return it in the enclosed envelope by **Monday, 27 August 2001**. Ten teachers will be contacted by **Monday, 10 September 2001** and asked to partake in the tape recording of their lessons. At this time, consent forms for the teacher and the students will be provided along with more details related to the recording of the lessons.

If you have any questions in relation to this study, please feel free to contact me at (09) 489 –6339 (work) or (███████) (home). You may also contact either of my supervisors, Teresa Ball at (06) 356 – 9099 extension 8770 or Roger Openshaw at (06) 356 – 9099 extension 8847, Massey University.

Thank you for your time.

Sincerely,

Jill Laursen

Appendix D   Consent Form for Teaching Participants

Infusing Thinking Skills in Year 4-6 Classrooms: Successful Strategies in New Zealand Classrooms

CONSENT FORM FOR TEACHING PARTICIPANTS

I volunteer to be tape recorded and interviewed for the research into promoting thinking skills in the Year 4-6 classrooms. I have read the Information Sheets about this research as part of a Master of Education degree and understand the expectations of my involvement. I agree to participate in Phase Two of the research and Phase Three if I am asked. I am aware that I can ask questions at any point in time and I have been made aware of those to whom these questions should be addressed. I have been informed that:

- I cannot begin recording lessons until all the students in my class have returned the consent form
- If any students and their parents do not agree to participate in this research I must make other arrangements for them during the recording of the lessons
- I can audio tape or video record 1 – 3 lessons that I believe reflect the promotion of student thinking
- If I am not comfortable tape recording the lessons, the researcher will come in and record the lessons
- I will be reimbursed for the tapes I use as part of this research project
- All tapes will be transcribed by the researcher for the purpose of analysis
- After the tapes have been transcribed, I may be asked to participate in an oral interview (Phase Three) that will take approximately one hour and be recorded, transcribed and analysed

I understand I have the right to withdraw from the study at any time and to decline to answer any particular questions.

I agree to provide information to the researcher on the understanding that my name will not be used without my permission.

The information will be used only for this research and publications arising from this research project.

I agree/do not agree to the interview being audio taped.

I agree/do not agree to the interview being video taped.

I also understand that I have the right to ask for the audio/video tape to be turned off at any time during the interview.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signed: ....

Name: ....

Date: ....

This consent form will be kept secure for the duration of the study and for three years following its completion.

Appendix E   Information Sheet for Teaching Participants Involved in Audio or Video Recording Their Classroom Lessons: Phase Two and Three

Information Sheet for Teaching Participants Involved in Audio or Video Recording Their Classroom Lessons: Phase Two and Three

Thank you for your participation in Phase One of my research into the successful infusion of thinking skills in Year 4-6 classrooms in New Zealand. This focuses on primary teachers who are consistently and consciously promoting student thinking. As a teacher who scored highly on the promotion of thinking skills in the classroom, I would like to ask you to participate in Phase Two of my project and potentially Phase Three. This information sheet is related to Phase Two and Three of my research.

As a participant you will be asked to audiotape or videotape record 1 – 3 of your classroom lessons that you believe reflects some of the statements found on the self-assessment scale you filled in earlier. Choosing video or audiotape is your personal decision if you choose to do the recording yourself. If you would prefer for me to conduct the audio or video recording, we will arrange a time that works for the both of us. The lessons can be on any topic in any curriculum area. They can also be of varying length. Before any audio or video recording can begin, you must distribute the parent and student information sheets and consent forms that I will provide to any children who might be present during your chosen lessons. When all the forms are back, I will collect them or you can post them in the self-addressed stamped envelope. At this point you may audio or video record your lessons or I will come in at a pre-arranged time to do the recording for you. Any child who is not given permission by their parents cannot be recorded. It is anticipated that the lessons can be audio or video recorded by **Friday, 9 November** but this date can be altered. I will arrange retrieval of the audio or video recordings in a manner most convenient for you. I will reimburse you for the cost of any audio or videotapes used or can provide them ahead of time. Again, please let me know what is easiest for you. If you choose to do your own audio or video recording, please ensure the sound quality of the recordings before conducting the entire lesson.

I will transcribe these lessons and ask most teachers to partake in oral interviews to be arranged at a time convenient for each individual. The interview questions and discussions will be related to the teachers' suggestions for promoting thinking in New Zealand classrooms. It is envisaged that each interview would take about an hour. The interview would be audiotape recorded, transcribed and again returned for approval.

All student, school and teacher names will remain confidential. I will make every endeavour to protect anonymity by utilising pseudonyms and avoiding contextual references that could result in the identification of you, your students or your school. It is impossible to give an *absolute* guarantee of anonymity and confidentiality when information is being recorded but I will protect participants to the full extent allowed

by the law. You have the right to withdraw at any point up until the report is written. You will have the opportunity to read the final report before it is submitted and if you believe anonymity has not been protected the text will be altered to ensure that the final report maintains the anonymity of all participants. All materials will be destroyed at the end of the research process and consent forms will be held by the researcher in a locked drawer for three years from the date of publication. The findings of the research will be presented for assessment in fulfilment of the requirements for my Master of Education; copies of the thesis will be bound and placed in the Massey University library. The results may also be used for further professional development of teachers through courses or other publications such as journal articles or excerpts in books.

I have attached the teacher consent form and class sets of the parent information sheet, student information sheet, and student consent form. If you would like to be part of this study, please fill in the attached form and distribute the information and consent sheets to your students. I would like to have them all by **Friday, 19 October**. Let me emphasize again that the children are not the focus but permission is needed for them to be in the classroom. When I have received the consent forms, I will contact you about audio or video recording your classroom lessons but you are welcome to include a note about a preferred time.

If you have any questions in relation to this study, please feel free to contact me at (09) 489 – 6339 (work) or (⬛⬛⬛⬛⬛) (home). You may also contact either of my supervisors, Teresa Ball at (06) 356 – 9099 extension 8770 or Roger Openshaw at (06) 356 – 9099 extension 8847, Massey University.

Thank you for your time.

Sincerely,

Jill Laursen

Appendix F   Information Sheet for Parents of Student Participants

Information Sheet for Parents of Student Participants

My name is Jill Laursen.

I am in the process of undertaking my thesis to complete my Master of Education degree at Massey University. The aim of the research is to investigate suggestions for the successful teaching of thinking skills in Year 4-6 classrooms in New Zealand made by primary teachers who are consistently and consciously promoting student thinking.

Your child's teacher has been identified as a teacher who has an awareness of promoting student thinking in the classroom. In an effort to better understand the strategies used in New Zealand Year 4 – 6 classrooms, I would like to have certain lessons audio or video recorded so that specific approaches that advance student thinking can be identified and shared with other New Zealand teachers. Because your child's teacher promotes thinking through his/her lessons in the classroom, participation in this research will not cause any disruption to your child's learning. As a student participant your child might be audio or video recorded in class. The focus of this study is not the students but the teaching strategies. The recording of your child will be dependent on the lesson given and any response your child may or may not make. I will transcribe the audio or video recordings of these lessons and return them for teacher approval.

All student, school and teacher names will be treated with confidentiality. I will make every endeavour to protect anonymity by utilising pseudonyms and avoiding contextual references that could result in your child's identification. It is impossible to give an *absolute* guarantee of anonymity and confidentiality when information is being recorded but I will protect participants to the full extent allowed by the law. You have the right to withdraw at any point. If your child is recorded on the audio or video tape, you will have the opportunity to read the final report before it is submitted and if you believe your child's anonymity has not been protected the text will be altered to ensure that the final report ensures anonymity. All materials will be destroyed at the end of the research process and consent forms will be held by the researcher in a locked drawer for three years from the date of publication. The findings of the research will be presented for assessment in fulfilment of the requirements for my Master of Education; copies of the thesis will be bound and placed in the Massey University library. The results may also be used for further professional development of teachers through courses or other publications such as journal articles or excerpts in books.

I have attached a consent form and a copy of the information sheet provided to your child for his/her permission. If you do not object to your child being audio or video recorded during lessons taught in the classroom by his/her teacher, please fill in the attached form and return it along with your child's signature in the enclosed envelope by **Wednesday, 17 October 2001**.

If you have any questions in relation to this study, please feel free to contact me at (09) 489 – 6339 (work) or ▮▮▮▮▮▮▮▮ (home). You may also contact either of my supervisors, Teresa Ball at (06) 356 – 9099 extension 8770 or Roger Openshaw at (06) 356 – 9099 extension 8847, Massey University.

Thank you for your time.

Sincerely,

Jill Laursen

Appendix G   Information Sheet for Student Participants

Information Sheet for Student Participants

My name is Jill Laursen.

I am a researcher at Massey University. I am completing a project related to thinking skills Year 4-6 classrooms. I am studying how teachers help students to think about their thinking. By finding out more about the ways your teacher does this in your classroom I can write suggestions for other teachers so that they might teach some of the same skills in their classrooms. Teachers are very busy and have a lot of different subjects to teach so it is always useful to learn from other teachers in similar situations.

Your teacher has been chosen to help me with my project. I would like to have lessons audio or video recorded so that specific ideas that can promote student thinking can be pointed out and shared with other New Zealand teachers. As a student participant you might be audio or video recorded in class. *I am not studying you* in class but your teacher. I will write down all the words I hear on the audio or video recordings and return them to your teacher to make sure that I have written everything accurately.

Your name, the name of your teacher and the name of your school will not be used in my project. I will use pretend names or pseudonyms. I will do everything I can to make sure that the things you say are kept private and that you cannot be identified. It is impossible to give an *absolute* guarantee of this when information is being recorded but I will do everything the law allows me to not let your name be used and protect your identity. All materials will be destroyed at the end of the research project. I will turn in my assignment/project to Massey University and copies of it will be placed in the Massey University library. I will give your school a copy for you to read.

I have attached a consent form. If you do not mind being audio or video recorded during lessons taught in the classroom by your teacher, please have your mum or dad or guardian fill in the attached form. Then both of you must sign the form. Please return it to your teacher by **Wednesday, October 17**.

If you have any questions in relation to this study, please feel free to call me at (09) 489 6339 (work) or (▮▮▮▮▮▮) (home). You may also contact either of my supervisors, Teresa Ball at (06) 356 – 9099 extension, 8770 or Roger Openshaw at (06) 356 – 9099 extension 8847, Massey University.

Thank you for your time.

Sincerely, Jill Laursen

Appendix H   Consent Form for Student with Parent/ Guardian consent

Infusing Thinking Skills in Year 4-6 Classrooms: Successful Strategies in New Zealand Classrooms

CONSENT FORM FOR STUDENT PARTICIPANTS

I have read the Information Sheet about this research as part of a Master of Education degree and understand the expectations of my involvement and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time. I also understand that the focus of the research is on the teacher and his/her responses, not the student however, classroom conversations that I may participate in will be audio or video taped.

I understand I have the right to withdraw from the study at any time and to decline to answer any particular questions.

I agree to provide information to the researcher on the understanding that my name will not be used without my permission.

The information will be used only for this research and publications arising from this research project.

I agree/do not agree to the interview being audiotaped.

I agree/do not agree to the interview being videotaped.

I also understand that I have the right to ask for the audio/video tape to be turned off at any time during the interview.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signed: ....
(Student signature)

Name: ....
(Student name)

Signed: ....
(Parent/Guardian signature)

Name: ....
(Parent/Guardian name)

Date: ....

This consent form will be kept secure for the duration of the study and for three years following its completion.

Appendix I   Summary of Promoting Student Thinking: O'Brien's Teacher Self-Assessment Scale

Summary of self-assessment responses						
	Teacher A	**Teacher B**	**Teacher C**	**Teacher D**	**Teacher E**	**Teacher F**
1	often	very often	often	often	often	often
2	often	very often	sometimes	sometimes	often	sometimes
3	very often	often	often	sometimes	sometimes	often
4	very often	often	sometimes	often	often	sometimes
5	often	very often	sometimes	sometimes	sometimes	often
6	very often	often	sometimes	very often	sometimes	sometimes
7	very often	very often	often	often	very often	often
8	very often	often	sometimes	often	often	sometimes
9	often	very often	very often	sometimes	often	sometimes
10	often	often	often/sometimes	sometimes	sometimes	often
11	very often	very often	seldom	sometimes	seldom	very often
12	very often	sometimes	sometimes	very often	sometimes	often
13	very often	often	sometimes	seldom	sometimes	often
14	very often	very often	often	often	very often	often
15	often	often	no response	sometimes	often	sometimes
16	often	often	sometimes	sometimes	very often	sometimes
17	very often	often	very often/often	sometimes	often	often
18	often	often	often	sometimes	often	often

Appendix J   Extract from an Observation: Phase Two

Year 5/6

Lesson Topic: Follow-up on Sept. 11 Discussion *(two months later)*.

Two lessons back to back: one based upon the change that has happened since September 11 and one point of view (p.o.v.) exercise from that of an American child whose mother was killed or Afghan child who has to leave the country.

Time:

Lesson One: Change	Lesson Two: P.O.V.
Initial discussion: 5 minutes	Initial discussion: 5 minutes
Group work: 21 minutes	Group work: 6 minutes
Group presentation: 5 min	Group presentation: 5 minutes
Teacher wrap up: 2 minutes.	Wrap Up: 6 minutes

T represents the teacher. Names have been randomly chosen by the researcher to represent the gender only, not the ethnicity. Italics represent an emphasis on the word. A – means the speaker was interrupted. The ... represent a pause of about 2 seconds and (pause) is written if the pause was anywhere between 2-8 seconds.

There are a lot of names so I have listed them below to help with identification of group members and to track what each child has said. Some children are not always present during the group work because reading groups were being pulled out of the classroom by another adult as the recording took place.

Group One	Group Two	Group Three	Group 4
Ashley	Katie	Monty	Tracy
Sarah	Ana	Claire	Lizzie
Cody	William	Miriam	Pam
Jack	Greg	Alisa	Ivan
Lucy	Kurt	Hamish	Fraser
Jay	**Jay	Andrea	Gillian
			Chelsea

** Jay moved to Group Two for the second lesson. The researcher does not know why but in viewing the tape there was an incident in during Group One's first presentation where Ashley pushes Jay out and whispers for him to sit down. This may have affected his decision to move into another group as he is the only child who changes groups during these lessons.

T: This is a date (puts up a paper with September 11 2001 on it)...

Boy: When it happened!

Girl: What happened?

T:...that is probably going to be quite famous (pause) for many, many years to come. At this stage it's the greatest news event that we've had this millennium, although this millennium has only lasted for two years so far. I want to hear *one* word from you, if fact, let's make the circle bigger because it's not very big (kids move from being clustered on the mat to sitting in big circle, larger enough for everyone to see each other). You can pass if you want, you can pass if you want but I want to hear one word to do with September 11th.

Ashley: One word or one idea?

T: One word, just one word. Ashley, one word (going in order around the circle).

Ashley: Crash!

Katie: Hijack

T: uh-uh

Lizzie: Sad.

T: (quietly) Sad...

Andrea: Um...pass.

Jack: Fire.

William: Disasterous.

T: (quietly) *Disasterous!*

Hamish: Afghanistan.

Ivan: Buildings.

Kurt: War.

Jay: Frightening.

T: What was that?

Jay: Frightening.

T: (quietly) *Frightening.*

Lucy: Terrorism.

Ana: pass

Chelsea: Osama bin Laden.

T: (quietly) *Osama bin Laden.*

Claire: Twin Towers.

Tracy: Airplanes (everyone in the circle at that point has had an opportunity to say something).

T: And I would say *change*, if I was going to us one word.

Ashley: Why?

T: Why do you think I might use the word change? That's the main word that I think of when I think of that day. Jay?

Jay: Because it changed the, it changed the, it hijacked the airplane.

Kurt: Well, the changed New York...yeah. Because of the buildings.

Hamish: It changed some people's lives forever.

T: In what way?

Hamish: Because of the, um, 15,000 people I think that died.

William: More than 15,000!

Hamish: Yeah, whatever, more than 15,000 people that died and the 260 people that died on the planes and the 300...

T: It definitely changed the lives of those people who died. It *ended* their lives. How would it change *other* people's lives?

Hamish: Because of their relationships to those people and what it meant to them.

T: That's a great answer Hamish...Will?

William: It changed the world and it just brought shock to everybody and how that somebody would just do that. It's so amazing.

Ashley: And how much money was wasted on buildings and people.

T: Uh-huh.

Tracy: Some people lost their jobs.

T: Some people lost their jobs...that's a good change idea.

(Loudspeaker interrupts)

Chelsea: Well for instance for people that got killed, if you've got relatives, it could be the husband, it could be your dad, it could be your wife or it could be your granddad or it could be your relatives...

T: Claire. Last one?

Claire: It could change (can't decipher) like it could be (can't decipher) and it would be really sad.

Chelsea: And say the Twin Towers, they used to be one of the most popular building in America and you could see in America that there used to be the two Twin Towers behind it so since the Twin Towers have gone it's made a big difference of change.

T: It certainly has. I'm going to get you to write down some of your ideas (getting out paper). Each of you, not each of you, each *group* will have a piece that looks the same as this here (referring to the paper with September 11 2001 at the top) and I want one person in each group to be the recorder, one person in the group to be the reporter –

that person is going to report back the ideas of the group. One person to be the time keeper and I'll allow one person, I think you've got enough in each group, I'll allow one person to be the hitchhiker. So after a certain amount of time, I'll let you hitchhike to another group.

Uh…whero. Hands up if you are in whero reading? 1, 2, 3, 4 can you go and do your play now with Chelsea's mum? (those 4 children leave and 4 more come in).

I want every person in the group to contribute at least one sentence or one thought about this day here: September 11 2001. Obviously you all remember it.

1, 2, 3, 4; 1, 2, 3, 4; 1, 2, 3, 4; 1, 2, 3, 4; 1, 2, 3, 4. I want the ones to come and you can sit at the Tigers desks. (children begin moving). Twos you can sit at Thunderbolts. Threes at the Looney Toons. And my fours…anywhere else. (a bit of confusion so teacher, holding a big box of Crayola marker felt pens, stops the class). Who can't remember their number? (no hands go up). Oh good! So the ones are here, the two sitting at Thunderbolts, threes sitting at Looney Toons, and my fours, Brainy Bunch. (some time spent sorting out a few stray kids – kids are talking about Sept 11 or their own topics).

I'm going to give you (pause – kids quiet down) 15 seconds to quietly decide, actually I'll give you a little more, I'll get you to do all your roles, you can decide who's going to be the recorder, who's going to be the reporter, who's going to be the hitchhiker and who's going to be the time keeper. Ashley. William. (some kids talking - now almost all quiet). The recorder comes and gets a different coloured pen for each person in their group so that when you write down or record each idea – it's in a different color. (Kids get pens. While this is happening I record a world map hanging on front white board with Afghanistan, Egypt, Middle East, United States, United Kingdom, and France, outlined and labelled. I move to one group. Classical music has been put on in the background by teacher)

Ashley: (explaining to Cody who does not seem to know what to do) We are writing about things that happened on September 11.

Sarah: You know, the hijacked planes!

Cody: Yep!

T: 3…2…1. Still waiting for quiet. Katie. Still waiting. Are there any groups that haven't worked out their roles?

Ashley: We've got, everybody apart from Cody has a role and the only person left is a hitchhiker. He's the recorder, he's the timekeeper and me and Sarah are reporting.

T: You've got about 8 minutes to write down your thoughts. The recorder records all of the thoughts or sentences, a different color for each person's idea. Katie, you record using the pens down there.

Group One

Sarah: Four hijacked planes flew into the Twin Towers.

Ashley: No, there was only three.

(I move to be with the teacher)

T: Where did it happen?

Fraser: New York.

T: What about the people, New York is on the East Coast (referring to map), what about the people who live on the West Coast, how might they feel?

Lizzie: They might, they might have relatives who died?

T: Yes, yes, good. How else, if I lived on the West coast and I didn't know anyone who died, how would that change my life?

Ivan: You'd be worried sick about, even if you didn't know anyone who died.

T: Good point, even if my relatives, even if I don't know anyone who died, I'd be *worried sick*. Why would I be worried?

Tracy: Because of the Twin Towers going down and then people lost their jobs.

T: Yeah, in just October, in one month, 400,000 in the United States lost their jobs. That's half of Auckland losing their jobs in one month. It changed America forever (referring to what they had written).

Tracy: It would be worrying for people feeling sorry for the other people who don't have a job.

T: It's a worry. Very good, very good. Has it changed you at all?

Tracy: No.

Pam: Yeah, because I felt sorry for the people (Teacher leaves, I stay on a bit)

Fraser: I was scared! I was scared because it might have done a World War.

Pam: Then New Zealand might be in the war and my dad might have to go to fight.

Tracy: Yeah, she'd (referring to Pam) be scared because her dad is in the Navy.

Appendix K   Focussed Teacher Interview Questions: Phase Three

Interview Questions

Background and contact information

1. How long have you been teaching?

2. Where were you trained?

3. What age groups have you taught?

4. It is envisaged that portions of this thesis will be completed in February for you to review to ensure that I have accurately represented the lesson and your profile, though no names will be mentioned. Where would you like a copy sent for you to read?

Rationale for teaching

5. How do you see your role as the teacher?

6. What is your philosophy about teaching and learning?

7. Why do you think the direct teaching of thinking skills is valuable?

8. What type of thinking are you consciously promoting in your classroom?

Your Role in Promoting Student Thinking

9. What are some examples of thinking tools you use in your classroom?

10. How do you introduce the different thinking skills/tools?

11. How do you model thinking strategies?

12. How often do you think aloud?

13. How do you encourage the children to challenge each other's ideas in the classroom?

14. How do you integrate thinking skills with 'real life' applications in your teaching?

15. What are some important considerations that you make when questioning children?

16. What type of classroom management tools do you utilise?

17. Do you believe that classroom management has an affect on your instruction of thinking skills in the classroom? If yes, in what way? If no, why not?

18. Give some examples of reflection that occur in your classroom.

19. What role does the language of thinking play in your classroom?

Formative Influences on your teaching

20. What kind of support have you had – an interested colleague, schoolwide approach, personal professional development, etc?

21. Has your school been on any type of contract that you think has helped to promote thinking skills in the classroom (i.e. integrated curriculum, gifted and talented, portfolio assessment, philosophy for children, etc.)?

22. Are there any programmes or authors that you find particularly helpful when planning for thinking?

23. What is the main obstacle preventing you from teaching thinking skills even more in-depth?

Assessment

24. Does your school assess thinking skills? If so, how?

25. Does your school assess the essentials skills in the curriculum? If so, how?

26. Do you have any recommendations on the assessment of thinking skills?

27. Any other comments you would like to make?

Appendix L   Extract from a Teacher Interview: Phase Three

Your Role in Promoting Student Thinking

9. What are some examples of thinking tools you use in your classroom?
Similar things to brainstorming, mind maps, graphing and also lots of discussion

10. How do you introduce the different thinking skills/tools? (answers to 11. How do you model thinking strategies? included)
I model myself quite a lot and discuss and if somebody else has a good idea or way of doing things we use that. Yeah, demonstrating by modeling, not just me modeling but modeling what other children have done too. *(I make reference to volcano brainstorm that I did not actually see being done).* I did the volcano brainstorm while they were doing their own. I said I'll do that the same time they are doing theirs and it's a competition to see if anyone can beat the number of words that I could think of – we're just going to write down everything we can think of in the 5 minutes – some children just about got as many as I did (Years 3/4).

12. How often do you think aloud?
Quite a lot really. I say, we could do it like this or maybe we could change it. I do that myself when I'm doing things.

13. How do you encourage the children to challenge each other's ideas in the classroom?
 Well I encourage lots of different viewpoints, a good variety, and emphasize that there is no right or wrong when you've got opinions and everyone is entitled to what they think. We should value differences and that we can disagree but we can still value that somebody has thought something different to us. So to appreciate diversity so the children feel that they can give their opinions and that they are going to be appreciated.
　　　We were watching a video on the Mt Erebus disaster today and first of all it said that the pilot was to blame and then (unclear on tape – something about 'mechanical') and I kept stopping the video and saying, "What do you think?" to get them to look at the people's different viewpoints

14. How do you integrate thinking skills with 'real life' applications in your teaching?

Well, I always relate them to topic and disasters is a really good one because there are lots of 'what ifs' and 'what could we do' or 'how could we stop that from happening', prevent it. Like something we've been looking at, there is the terrible fire in Tokyo in 1923 and the fire prevention and why it is so bad. They rebuilt Tokyo to try and prevent it.

We've been doing a lot of problem solving in maths along with strategies. We've been using that new series (shows the Ministry Figure it Out books). It's fabulous! It really motivates the children and it's got all kinds of real life problems in it. There is one on sport which my boys love. So I find this is really good for relating the maths to real life problems.

15. What are some important considerations that you make when questioning children?
To value everyone's ideas and appreciate any contribution even if someone gives an answer that isn't correct, say, "It's really great that you thought about that really well. I'm glad you're thinking," so that they don't feel they are only going to say something unless they know it's right. I think that's important. Also to praise creativity and any examples of divergent or creative thinking so that you encourage them and they want to do that and share it with the children when someone does something so that they'll want to produce ideas like that.

16. What type of classroom management tools do you utilize?
I think I have an emphasis on self-management and internal rewards rather than, I'm not into stickers and things that I give. I do on task writings regularly where I'll stop the class and I'll get them to rate themselves on a scale of 1-10 how on task have they been, how well have they worked with a partner and then they try to see if they can improve their rating and get 10/10. I've also got cards in their desk about what they feel they've done really well on and they set themselves goals which they keep changing. When they think they have achieved their goal they get another one and that's appealing for them that they do it. I do term by term goals, daily, so that they are constantly monitoring how they're getting on themselves. I try to make them responsible for themselves. *(Are they honest?)* They've become a lot more honest. Some of them weren't. Some of them are absolutely honest. I think they are a bit hard on themselves actually, harder than I would be and there are a few, it's more the off task children that don't realize how quite off task they are. I see them as off task but perhaps they'll rate themselves a 7 when I think they've been quite off task and I've had to point out 'you weren't' or rather 'I don't think you were because you were doing this, that, and that.' *(They weren't aware?)* Yes, they haven't seen that. Sometimes they can justify it but sometimes they have noticed or realized. I find it's actually helped those

children to become more focussed. They are more aware of what they are doing and how much they've achieved. Also, we look at what they've achieved and look at whether they've achieved 5 minutes work, an hour's work or a day's work? Have they done the maximum they could have done in that time? I'm trying to put the onus on them rather than me. You know standing behind them with a whip telling them to get on...

17. Do you believe that classroom management has an affect on your instruction of thinking skills in the classroom? If yes, in what way? If no, why not?
Yes, because it's making them think. It's making them question what they are doing all the time, think about how they can do things differently, better, more efficiently. *(Do you point out on task children?)* Yes, I ask the others. Why do you think it is that XXX and XXX have totally finished and they are the first ones? Then they come up with 'they've been on task', 'they are working really well together', 'haven't wasted any time'.

18. Give some examples of reflection that occur in your classroom.
We do a lot of evaluation of our own work and other's work which I try to encourage to be positive. Like when we finished these paintings I told them that they could choose one person's painting to describe what they like about it and they have to try to come up with something different if possible, like if someone said they liked the use of color or contrast, not to use that again but to try and come up with something else that they liked. We often do that with written work, artwork, maths. Evaluate their own work or if they worked with a partner how well they did, what they could do better, what they liked about what they did, then they can use those things next time if they liked someone else's work.

19. What role does the language of thinking play in your classroom?
I think language is vital and that we need a very wide, varied vocabulary. They need lots of different ways of saying things so that they can improve their self-expression and their writing with the more vocabulary they have. As to a limit as far as I'm concerned, if they can understand and do it then I don't care what age they are, then they are ready for it. I think that improves their ability to think and express themselves. They can talk, and discuss and manipulate language in a way.

Appendix M Timeline of Data Gathering

The self-assessment scales were distributed to selected schools in Auckland, New Zealand between August and October of 2001. Following the selection of teaching participants, meetings were arranged to complete Phase Two: Class Observations and Phase Three: Focused Interviews. All meetings with Year 3-6 teachers occurred at the teachers' school sites.

	Class Observation	Interview
Teacher A	Thursday, November 8	Thursday, November 22
	11:00 – 11:45	3:45 – 4:45
Teacher B	Wednesday, November 14	Thursday, November 29
	11:00 - 12:00	3:30 – 4:30
Teacher C	Thursday, November 29	Wednesday, December 5
	11:30 – 12:30	1:30 – 2:30
Teacher D	Thursday, November 8	Thursday, November 22
	11:45 – 12:30	3:30 – 3:45
Teacher E	Wednesday, November 14	Thursday, December 6
	1:30 – 2:00	3:30 – 4:00
Teacher F	Wednesday, November 14	Thursday, November 29
	12:00 – 12:30	4:30 – 5:45