COLLABORATIVE PARTNERSHIPS: AN INVESTIGATION OF CO-CONSTRUCTION IN SECONDARY CLASSROOMS

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HEATHER L. MANSELL

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Abstract

The understanding that learning develops best in participatory, collaborative, interactive partnerships suggests that attempts to establish such relationships in classrooms deserve scrutiny. This study investigates co-constructive approaches to teaching and learning in a New Zealand secondary school. It studies co-construction from the perspectives of seven mathematics teachers and one art teacher and their students, as the teachers attempted to co-construct aspects of the classroom curriculum with students.

This study focused on the practices, understandings and expectations of both teachers and students when co-constructing. In addition, it identified the potential constraints and difficulties that impacted on such practices in this secondary setting. Ideally, such classrooms demonstrate collaborative, democratic, socially just practices with sharing of power between teacher and student: ideas emanating from theorists such as Dewey, Bruner, Freire and Vygotsky. This interpretive study responds to the dearth of research in New Zealand secondary classrooms about such approaches. It draws on principles and methods of grounded theory (Charmaz, 2003, 2006) to analyse the rich data generated by multiple methods. This allows the meanings of participants to prevail, by guarding against the imposition of meanings from either literature or researcher. Methods of data collection included classroom observation, interviews with teachers and groups of students, audiorecording and various forms of documentation sourced from these.

The findings showed co-constructive practice has shared characteristics, such as spontaneity, quality teacher-student communication with a stress on the teacher as a listener, active participation by learners, and a distinction of varying qualities of practice. However, classrooms are not formulaic, as each teacher evolves their own approach. Initially, strong subject pedagogical traditions and mythologies emerged as barriers to co-construction, particularly in mathematics. Learning is involved for all participants in pedagogical change. Students generally responded positively as co-construction provided opportunities for some input, choice and control of their learning which improved relevance, motivation and responsibility.

While very aware of the issues related to the use of particular strategies such as groups, the positives of helping each other learn prevailed.

The numerous potential constraints to easy implementation of co-construction reflected the diversity of teacher and student personal traits and beliefs about pedagogy, roles, and responsibilities. Moreover, teacher subject and pedagogical knowledge had import, as did their need to establish control and a relationship of trust with a class. The difficulty of secondary settings was endorsed. However, despite these, aspirational reasons for continuing to co-construct were expressed in the benefits experienced by both teachers and students.

This study demonstrates how co-construction features in the daily interactions which comprise the classroom curriculum, even where there are constraints to formal consultation over content of classroom programmes. If the bi-directionality of classroom interactions is acknowledged, students have spaces for influence, input and control. It affirms the importance and the diversity of perspective that both teachers and learners bring to the partnership. The need to persevere to establish and grow this approach in secondary schools is strongly advocated. This approach maximises respectful relationships, dialogue, innovation, and excitement in teaching and learning.

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Table of Contents

Tables

Figures

Chapter One

Introduction to the Study

> On the basis of what we have learned about human learning - that it is best when it is participatory, proactive, communal, collaborative, and given over to constructing meanings rather than receiving them - we would do better to renew our schools along these lines…. (Bruner, 2006, p. 182)

It seems prudent and timely to take cognisance of Bruner's advice if schools are to maximise what is known about learning. Moreover, approaches to classroom teaching and learning which aspire to develop participatory, collaborative partnerships between teachers and students have a long history. Unfortunately, their popularity waxes and wanes, affected by influences which include the resilience of traditional teaching practices, the socio-political context, and changes in education policy. A current resurgence of attention internationally, generated in part by interest in exploring sociocultural approaches makes this study timely. Its main purpose is to investigate co-constructive approaches to teaching and learning in a New Zealand secondary school. It studies co-construction from the perspectives of teachers and students as the teachers attempted to co-construct aspects of the classroom curriculum with students.

The focus of this study arose from a convergence of factors, which the following sections outline. Aspects of my professional history that contributed to my interest in this topic are discussed. Then a brief account of some of the contributions of influential thinkers from the past to the use and understanding of co-construction is presented. To follow, the features of New Zealand's educational and research context which generated questions about co-constructive approaches are clarified. And to conclude, an overview of the contents of the remainder of the thesis is provided.

1.1 My teaching and learning experiences

The choice of research topic, the methodology and subsequently the methods used to investigate the questions posed, are greatly influenced by the predilection of the researcher. This can be termed a life cycle (Glaser, 1978; 1992) or personal source of subject suitable for investigation (Burns, 2000). My interest in this topic comes from several influences from my past and current working life. As a former secondary teacher, I intentionally negotiated with my students, where possible and relevant, aspects of our classroom curriculum using a range of strategies. For example, at the beginning of a school year I would provide my Year (Y) 13 English class with the prescription and together we would develop the year's programme to include their preferences and a suitable sequence. I also frequently asked students to work together in groups on tasks, so they could help each other. Also, in my other professional role as a school counsellor, I was interested in students' perceptions of school. Many found what they were expected to learn irrelevant to their lives. I came to advocate for the rights of young people in the decision-making related to their lives.

More recently, I became a teacher educator. I teach in the areas of pedagogy, learning theory, curriculum, assessment and adolescent development. This provides me with a desire and opportunity to continue learning, and has alerted me to a wealth of theoretical and research literature. My entry to this job forced me to confront anew my beliefs and preferred teaching approaches. If possible, I avoid traditional, transmissive style lecturing in a large theatre. In one paper I teach much as I did in my secondary classroom, in a room where we have the flexibility to move desks into various groupings so students can work together, and learn from each other.

Another aspect of my work as lecturer is research. Current issues in education often provide the impetus for investigations. In the late 1990s I was involved as a researcher on the impact of educational reforms (particularly in the area of curriculum and assessment) on teachers' work and students' learning (described

briefly under 1.3 in this chapter). This was another experience which helped direct my attention to contemporary classroom practices.

1.2 Antecedents

I began with the term *curriculum negotiation* (later renamed *co-construction*, see Chapter 2.2.3) to describe a particular kind of interaction between teacher and students. Classroom negotiation is regarded as an important process in literature on curriculum implementation and learning (Beane, 1997, 2005; Bishop & Berryman, 2006; Bishop & Glynn, 2000; Boomer, Lester, Onore, & Cook, 1992; Holdsworth, 1999). To recognise negotiation is to endorse the view that learning is a transactional, interactive process, which involves activity, action and influence on the part of *both* the learner and teacher (Cooper & McIntyre, 1994, 1996; Grundy, 1987; Loughran & Northfield, 1996). Moreover, the term "bi-directionality" is sometimes used to convey this understanding (Cooper & McIntyre, 1994, p. 633). It could be argued that many traditional approaches are based on teachers making decisions about curriculum learning. Social constructivist and sociocultural paradigms increasingly challenge traditional views of a learner as a passive receptacle of the knowledge that the teacher imparts. Advocates of these contemporary theories argue that learning not only requires greater learner consent, participation and self-regulation, but view learning as shared participation in a collaborative process (Blumenfield, Marx, Patrick, Krajcik, & Soloway, 1997; Grundy, 1987; Rogoff, Bartlett & Turkanis, 2001; Sewell, 2006; Vialle, Lysaght & Verenikina, 2005).

Influential theorists in education have advocated the importance of teachers and policy makers seeing the learner as an active participant in classroom decisions about learning. This features in the writings of Bruner (1986, 2006), Dewey (1966), Freire (1993), Vygotsky (1978), Stenhouse (1967), and Rudduck and Flutter (2000). It is argued that not only are students able to collaborate with teachers to develop their classroom curriculum, they are regarded as active theory builders about how they learn. The democratic principles of participation, responsibility, and right to dialogue underpin such a view of learners and it can

even be considered a human right. (The United Nations Rights of the Child will be referred to later.) Yet the extent to which students *are* involved in decisions about their learning may still be minimal even if involvement is seen as desirable.

The principles of student-centred education have longevity (Bruner, 2006; Dewey, 1966; Elliott, 1998; Fraser, McGee & Thrupp, 2008; Pinar, Reynolds, Slattery & Taubman, 1995). Dewey, in particular, leaves an enduring legacy. For over a century, often under the banner of progressive education, a number of teachers have urged that students' needs and interests should be considered, and included their students in decisions about their classroom studies. This involvement of teacher and learner seems self evident if one views learning as a reciprocal process: a conjoint activity. The child's active experience of community in democratic and cooperative activities was central to Dewey's conception of education (Pinar et al., 1995). He argued for a school structured as a democratic community with an aim to improve society. This required a curriculum constructed around the child. (The views of Dewey and other antecedents to co-construction are discussed in more detail in the following chapter.) Such Deweyan child-centred views have coexisted with other understandings of the roles of the teacher, learner and curriculum, and, as my introduction foreshadows, have had phases of ascendency then waned. The reasons were very dependent on the socio-political climate of the time. However, they included distortions of his tenets by various educational movements, and in some sectors progressivism developed a poor reputation because of public confusion with the more extreme child-centred discourse of permissiveness or *laissez faire* (see Pinar et al., 1995, Chapters 2 & 3).

Over the decades associated fields have kept this emphasis on student participation in classroom learning. They include cooperative learning (Johnson, Johnson & Holubec, 1994), guided discovery learning (Bruner, 1996), integrated curriculum (Beane, 1997; 2005; Brown & Nolan, 1989), and more recently, culturally responsive pedagogy (Bishop, 2008; Bishop & Glynn, 2000; Gay, 2000; Ladson-Billings, 1995) and communities of learners (Brown & Campione, 1996; Rogoff, Turkanis & Bartlett, 2001; Sewell, 2006). New Zealand primary

education has for many decades strongly affirmed a child-centred philosophy (Aikin, 1994; McGee, 2008; Ministry of Education, MOE, 1993). However, the situation in secondary schools traditionally reflects a very different discourse (Bishop, 2008; Bishop, Berryman, Tiakiwai & Richardson, 2003).

Another significant contribution came from Australia. Garth Boomer (1940-1993) did much to promote the benefits of curriculum negotiation in the classroom from the 1970s to the 1990s, and his influence is acknowledged biennially in Australian Curriculum Studies Association (ACSA) conferences. An interest group in Australian secondary schools continues to focus on the importance of student participation in schooling and student voice in research. To my knowledge, New Zealand secondary educators do not have anything similar, apart from *Te Kōtahitanga*, which will be referred to later. Programmes in Australia to promote student participation have included democratic classrooms, students as researchers, joint curriculum design, middle schooling, negotiated curriculum and student networks (Hunter & Carlson, 1999). All seem to arise from similar principles, beliefs, and values regarding the positioning of the student in their education. That is, they are learner centred, require collaboration with other learners and teachers, and encourage learner ownership and responsibility in the learning process.

Boomer (1982b) advocated a partnership between teacher and students to develop and enact their classroom curriculum. Issues of power, ownership and responsibility are focal to this partnership process. It required changes to classroom interactions, away from the traditional teacher-directed classroom, to a situation of greater mutual interdependence between teacher and students. The teacher's role is described as changing from dictator to negotiator. Students are active; learning and teaching is collaborative; and social justice and democracy are underpinning beliefs. (Curriculum negotiation is described in greater detail in the following chapter.)

In 1992, Boomer et al. produced a "re-vision" of the explanation of negotiating the curriculum which had served in the 1980s, explaining:

> reconsideration and reconstrual is necessary because the theory of negotiation has built into it the necessity of constantly striving to modify or disconfirm its own present understandings. It is also necessary because a key component of the theory is that acts are always embedded in a rich socio-political context which must be acknowledged, interpreted and dealt with since it strongly influences and constrains classroom and institutional possibilities. (p. ix)

This message presented another reason for investigating curriculum negotiation in the New Zealand context at this time over a decade on from the publication of the review of the theory. There had been little research into the approach in New Zealand, apart from the Freyberg curriculum integration project (Brown & Nolan, 1989; Nolan & McKinnon, 1991). I wondered would the underpinning understandings require new emphases? Would they rebut contemporary critique? Would they fit the contexts of 21st century classrooms as Boomer et al. (1992) predicted? Since the late 1980s there had been major ongoing reform in administration, curriculum and assessment in New Zealand. This context is outlined next.

1.3 The New Zealand context

The past two decades have seen unprecedented change in New Zealand education. There have been major administrative, accountability, curriculum and qualification reforms. In 1993 *The New Zealand Curriculum Framework* (MOE, 1993) was introduced which radically revamped the curriculum from Y1 (age 5) to Y13, the last year of secondary education. It introduced seven learning areas, a uniform structure of levels of achievement and identified a set of other essential skills (MOE, 1993).

Aspects of the underpinning ideology and structure of the framework, and process of curriculum development and implementation were criticized (Aikin, 1994; Elley, 1996; Irwin, 1994; McGee, 1997; O'Neill, 1996; Snook, 1996). For instance, some slated the ideology as neo-liberal, market-driven, and New Right in its promotion of the ethics and values of business, economic individualism, global competitiveness and consumerism (Lee & Hill, 1996; O'Neill, 1996; Peters

& Marshall, 1996; Roberts, 1997). Others were concerned with the structure: the outcomes-based curriculum which the *Curriculum Framework* imposed. This view of knowledge and learning as hierarchical, in eight levels, and predetermined, was seriously challenged by Elley (1996), Irwin (1994), Armstrong (1991) and others. Former curriculum development had used a "rolling revision" model (McGee, 1997, p. 58). This continuous process enabled new practice to evolve and become established in schools, with a minimum of disturbance. In contrast, in this case instead of taking a rightful central role in the development and implementation of the curriculum change process (Elliott, 1994; McGee, 1997), teachers were sidelined under the supposed threat of their "provider capture". Furthermore, concerns about inadequacies in time, teacher professional development (PD) and resource allocation were expressed over implementation (Thrupp, Harold, Mansell & Hawksworth, 2000). In spite of this, research into the impact of the curriculum reforms in the late 1990s, predominantly in primary schools, found generally positive responses by teachers to the curriculum, although they reported an increased workload and greater focus on summative assessment (Calder, 1995; Mansell, 2000; Renwick & Gray, 1995; Thrupp et al., 2000; Wylie, 1997).

Participants in the Thrupp et al. (2000) study were in the main ambivalent in their assessment of the impact of the *Curriculum Framework* on teachers' work. Some identified changes which they felt were improving practice, such as greater detail in planning, links between planning and assessment, review of programmes, school-wide structure to curriculum coverage, focus on student needs, as well as more active teaching methods and realistic reporting to parents. However, others argued the greater precision, detail, and specificity, which pervades the descriptions of the change wrought in the areas of planning, programmes, assessment and reporting, described teachers striving to conform to the constraints of a system of much tighter government control.

The discourse in the *Curriculum Framework* (MOE, 1993) stressed the importance of assessment for better learning. Notwithstanding, teachers identified a preoccupation with summative assessment for records, reports and school wide

accountability at the expense of developing formative capabilities to monitor the learning process (Thrupp et al., 2000). In fact, formative assessment barely featured in the interviews. This is surprising given the curriculum and support documents in learning areas such as English and technology which seemed to encourage practices which characterise curriculum negotiation (MOE, 1993, 1994, 1995, 1997b). (This is described in greater detail in the following chapter.) It was also surprising that participants did not mention approaches to teaching which require student participation or learner input such as *curriculum integration* (Beane, 1997) or curriculum negotiation (Boomer et al., 1992). This contradicted the frequently stated changes in teachers' role to "facilitators of learning", in the same study, which suggest a much more interactive position in assisting learning.

The findings of this study raised for me, as a member of the research team, many further questions about the impact of the *Curriculum Framework* on teaching and learning, teaching approaches, formative assessment, and the child-focused tradition. This was another of the factors that pointed to the relevance of this present study. At the time I was wondering, with the changing curriculum and qualification context in secondary schools, to what extent was it still possible to negotiate the curriculum?

A comprehensive stocktake soon after (McGee et al., 2002, 2004; McGee, Jones, Bishop, et al., 2003; McGee, Jones, Cowie, et al., 2003; MOE, 2002), was preliminary to curriculum redevelopment. The resultant document, *The New Zealand Curriculum* (MOE, 2007b) to be implemented by 2010, pares back the over-prescription of achievement objectives of its predecessor, and reiterates more strongly the role of teachers as curriculum decision-makers. The introduction of key competencies and the inclusion of a section on pedagogy provide impetus for schools and teachers to disrupt their taken-for-granted views, and experiment with "new" approaches to teaching and learning. The document describes characteristics of teaching approaches that consistently impact positively on student learning. Many of these, for example, "enhancing the relevance of new learning, … facilitating shared learning, … making connections to prior learning and experience" (MOE, 2007b, p. 34), affirm the underpinning principles of a co-

constructive approach. Perhaps we enter another period of ascendency? Though internationally there is a considerable amount of research on curriculum negotiation (the following chapter presents this detail), there had been very little in New Zealand. In this decade, some has focused on early childhood and primary education settings (Harwood & Nolan, 2002; Ritchie, 1997; Sewell, 2006), but almost none on secondary schools. Some insight is needed into how these approaches can be developed in a secondary context, with its considerable differences in structure, environment and culture.

Further justifying this study is the consideration of student experience which has become a greater focus in research since the early 1990s (Cook-Sather, 2002; Flutter & Rudduck, 2004; Pinar et al., 1995; Pollard, Thiessen, & Filer, 1997). It is argued that taking student perspectives seriously can contribute to the quality of school life, the raising of educational achievement and the understanding of many important educational issues: "Effective teaching must recognise the concerns, interests and motivations of learners. It is not a delivery system" (Pollard et al., 1997, p. 11). This reiterates the multi-party nature of teaching and learning. Students' experiences of curriculum negotiation are part of the focus of this study. Observing their participation and listening to their perspectives is crucial to gaining a more comprehensive understanding of what might assist or hinder the development of co-construction.

The students in this study were predominantly, but not exclusively, young adolescents from Y9 and Y10 (aged from 13-15 years). Developmentally, this is a time of increased decision-making. During the early teens, youth are focused on important questions about who they are, what they will be, and how they seem to others (Noddings, 1992; Santrock, 2007). Participating in decisions about their learning and taking responsibility for their choices and decisions may assist their development of dispositions important for living. Also, in New Zealand schools, the years before credentialling starts seem a time where there may be greater opportunity to innovate, with fewer constraints to the classroom curriculum. The issue of student disaffection with education is sometimes raised in relation to this age group (Elliott, 1998; Roberts, 1998). Improving student engagement is a

prerequisite to improving achievement (Bishop, 2008; Bruner, 1996; Flutter & Rudduck, 2004; McCallum, Hargreaves & Gipps, 2000). Curriculum negotiation or integration is often identified as a way student engagement can be increased (Beane, 1997, 2005; Cook, 1992; Holdsworth, 1999; Rabone & Wilson, 1997; Yair, 2000a, 2000b). It will be interesting to see if such claims are substantiated.

A strong example of the importance and resonance of students' experience were the interviews which launched *Te Kōtahitanga* project in some New Zealand secondary schools (Bishop et al., 2003). In this project the narratives of Y9 and Y10 Māori students provide sobering data of the frustration and alienation that a number of students can experience. On the basis of suggestions from students, the research team developed an Effective Teaching Profile which was used in PD with teachers in the project's schools. This study has links with *Te Kōtahitanga*. The teachers in this study were, in the main, participants in that PD programme (see Chapter 3 for further details).

Research in classrooms, particularly in a secondary setting, is challenging. Many obstacles complicate the collection of evidence. The limited contact hours in a week between teacher and students (often only four), and the complications of navigating secondary timetables (which may run for six days, meaning no week is replicable) are examples (see Chapters 2 and 3 for further details). Therefore, it is perhaps not surprising that little has been done (Anthony & Walshaw, 2007). However, in the study of a pedagogical approach, reliance on interviews with teacher and student participants, though vital to representation of their perspectives, seems inadequate. The inclusion of regular classroom observation adds an important dimension as a touchstone for both researcher and participants. The rewards make the effort worthwhile.

1.4 Summary and outline of chapters

The main purpose of this study, *Collaborative Partnerships: An Investigation of Co-construction in Secondary Classrooms*, is to investigate the expectations, understandings and practices that constitute a co-constructive approach to

teaching and learning for teachers and students in classrooms in a New Zealand secondary school. It also identifies many aspects that can facilitate or constrain the process, some of which relate to the contextual realities of a secondary school and others to the perceptions of teachers and students. The timeliness of this report is underscored by the present international interest in sociocultural approaches; the clear recommendation that our teachers work in this way in *The New Zealand Curriculum* (MOE, 2007b); and the paucity of empirical research on curriculum negotiation in New Zealand, with virtually none in secondary schools in this decade.

This chapter has identified the foundations and influences which instigated this study into curriculum negotiation. A combination of personal, theoretical, and contextual factors provided the interest, motivation and impetus.

Chapter 2 reviews literature relevant to this thesis. This includes identifying the theoretical foundations of curriculum negotiation. The review raises questions about contemporary developments and terminology, outlines gaps and highlights important issues. Chapter 3 explains the methodology of the study, which draws on the principles of grounded theory. The methods used to generate and analyse data are explained with some examples. The research process is described and reflected upon.

Chapter 4 describes and discusses the findings about the classroom practices which characterise a co-constructive approach for both teachers and students, particularly in a secondary mathematics context. Further results feature in the following Chapter 5 which explains a range of issues and situations that enable and constrain the use of co-construction in this location. These are compared and contrasted with related existing literature.

The final chapter, Chapter 6, summarises the study, outlines limitations, and identifies contributions to knowledge. Furthermore, it considers implications for secondary teachers and students, teacher educators and curriculum policy. Some future avenues for study are suggested.

Chapter Two

A Review of the Related Literature

Introduction

The literature reviewed in this chapter comes from a range of sources, all of which mentioned some significant aspect related to curriculum negotiation. Major theorists from last century whose ideas contained the fundamental concepts of the approach were sourced. Most of the studies reporting research were selected because of recent classroom research and the use of qualitative methods. Action research case studies by practitioners were common. Examples from secondary education in a New Zealand context were sought and few were found. Studies from similar contexts in Australia, the USA, Canada, and Britain were perused. The classroom studies found ranged across a variety of subject areas. The search used a range of terms related to or synonymous with curriculum negotiation such as collaboration, co-construction, child-centred education, communities of learners, curriculum integration and student voice. The scope of the search included education data-bases such as ERIC, a wide range of education journals both hard copy and online, New Zealand Ministry of Education curriculum and related documents, as well as seminal literature in book form.

A search of the literature revealed reference to curriculum negotiation over many years. Initially, the historical sources of the underpinning ideas of curriculum negotiation are examined in the works of several influential theorists. This is followed by some current explanations of the approach. Confusingly, a range of terms was used to describe what is essentially curriculum negotiation. A brief selection represents these differently named pedagogical approaches which have similar foundations. Issues that might complicate the implementation of such principles were identified, preceding a discussion of which issues warrant further study.

2.1 Historical origins of curriculum negotiation theory and practice

Curriculum negotiation is based upon a number of foundational ideas. Their origins can be found in the work of influential thinkers such as Dewey, Freire, Vygotsky and Bruner. In this section the particular legacy of each of these for curriculum negotiation is briefly described.

Dewey

Dewey's (1859-1952) substantial contribution to education included the child-centred and democratic focus of the progressive education movement, a precursor of curriculum negotiation (Pinar et al., 1995). His understandings of a child-centred curriculum, active learning, and democratic schools are explained further. The term *child-centred*, like so many used in the education field over the last century, has accumulated numerous shades of meaning. The descriptions vary widely and some are contradictory. However, despite disputes over meaning and interpretation, the Dewey Laboratory School in Chicago was commonly identified as child-centred (Chung & Walsh, 2000; Pinar et al., 1995). Dewey himself (1966), in a critique of the "old education" decried:

> its passivity of attitude, its mechanical massing of children, its uniformity of curriculum and method. It may be summed up by stating that the center of gravity is outside the child. It is in the teacher, the text-book, anywhere and everywhere you please, except in the immediate instincts and activities of the child himself [sic]. (p. 103)

Dewey stressed the precept that quality experience must form the basis of the curriculum rather than it be external to and disconnected from children's lives. Central to Dewey's view was that children's immediate interests and needs should be the curriculum focus, rather than preparation for some future life divorced from these (Chung & Walsh, 2000; Dewey, 1963, 1966; Pinar et al., 1995).

Another Dewey tenet was that learning should be active. Contentiously, it was used to support contrasting theoretical positions. For example, Gardner regarded

Dewey's emphasis on "student self-pacing, practical, hands-on activities and co-operative discourse" (Prawat, 1995, p. 13) as central to constructivist reforms; whereas, Kivinen and Ristela (2003) identified "learning by doing" as supporting a Deweyan pragmatist position which views learning as "formation of habits of action" (p. 365).

The championing of democracy as an essential ingredient of schooling was another major legacy of Dewey. He believed that the school should be a democratic community where students actively experience cooperative activities of interest to them. Democratic practices should permeate the whole of school life. This meant that teachers and children should be involved in everything from curriculum making, governance, and programme planning, through to curriculum administration (Dewey, 1966; Pinar et al., 1995). The implementation of such ideas would seem to require a radical change to many of the customary structures of schools.

Attempts to put progressive education into practice began in the late 19th century and spanned the early decades of the 20th century with varying success and adherence to Dewey's vision. One version, the Denver Plan, highlighted the ongoing nature of curriculum revision and the centrality of teachers, rather than curriculum specialists, in this process. By 1933, units of study were planned jointly by students and teachers. Even at that time, however, there were varying understandings and practices regarding the optimal degree of student input (Pinar et al., 1995).

In many ways Dewey explained values which curriculum negotiation attempts to replicate. He centred his arguments about curriculum on the central players: the child and the teacher. While he placed importance particularly on the current personal experience of the child as a pivotal influence on curriculum, he also valued teachers as curriculum decision makers. He urged the enactment of the roles of democratic citizenship as essential to schooling.

Freire

Freire, renowned for *The Pedagogy of the Oppressed,* inspired the linking of literacy, culture and politics (Pinar et al., 1995). Using a "banking" metaphor to conceptualise the prevailing model of education, he criticised the narrow focus of the teacher-student relationship: "Instead of communicating, the teacher issues communiqués and makes deposits which the students patiently receive, memorize and repeat … the scope of action allowed to the students extends only as far as receiving, filing and storing the deposits" (Freire, 1993, p. 53). According to Freire, this disabled the development of the critical consciousness and creative power in students necessary to access learning and transform their world. He advanced a problem-posing pedagogy as an alternative to this. The social justice focus of the pedagogy worked for social, political and economic change in class-based power and domination. The aim was liberation. The vision of pedagogy was a dialogical relationship with students: "The teacher is no longer merely the-one-who-teaches, but one who is himself taught in dialogue with the students, who in their turn while being taught also teach. They become jointly responsible for a process in which all grow" (p. 61). Liberation requires praxis, which is the action *and* reflection needed for change. This concept has been very influential in education worldwide (Pinar et al., 1995).

Transformative or critical pedagogy (Giroux, 1988) is grounded in Freire's theories and often cited as influential for many proponents of curriculum negotiation (Boomer, 1992c; Lester & Boomer, 1992; Onore & Lubetsky, 1992). Giroux emphasised the agency of teachers and argued that they must move beyond being specialised technicians to become transformative intellectuals in order to develop a more socially just society (Aronowitz & Giroux, 1985, 1993; Giroux, 1988). He also elevated the idea of teacher and student voice, a key element in critical pedagogy (Pinar et al., 1995). Many of the key critical pedagogy concepts such as empowerment, student voice and dialogue are contested. Ellsworth, Wexler and Bowers provided strong examples of this critique (see Pinar et al., 1995, Chapter 5, for further details). For example, Ellsworth (1989) claims power dynamics in schools preclude democratic dialogue with students.

Vygotsky

Vygotsky argued that learning and development are historically, culturally and socially mediated, a view which is significant to curriculum negotiation (Vialle et al., 2005). It is commonly termed a sociocultural approach in literature which draws on his writings in the West (Wertsch, del Rio & Alvarez, 1995). Cultural mediation of development is through the influence of a culture's artefacts. These range from simple everyday articles such as a chair or pen to extremely complex systems such as "languages, traditions, religion, science and arts" (Vialle et al., 2005, p. 49). Children grow into the culture through learning and mastering its tools in social interactions and joint everyday activities with more experienced or capable adults or peers.

According to Vygotsky, the importance of social interactions in development is paramount. Indeed, he explained the interdependence of the individual and social when he claimed: "Every function in the child's cultural development appears twice: first, on a social level, and later, on the individual level; first, *between people (interpsychological)* and then *inside* the child" (Vygotsky, 1978, p. 57). This process of individual appropriation is called internalisation. The pathway of cognitive development is thus from the social to the individual (the opposite to Piaget). "The process of cognitive growth is inherently relational" (Goldstein, 1999, p. 648). The reciprocity and interdependence of this learning/developmental relationship is conveyed in the explanation that new understandings are co-constructed (Goldstein, 1999; Valsiner, 1988). Language is considered crucial to learning and development: "Social interactions … form and shape it from the start" (Vialle et al., 2005, p. 56). It is needed for communication, individual thinking, and self-regulation.

The zone of proximal development (ZPD) incorporates the distance between what a child can perform independently and what can be achieved in collaboration with someone more capable. "In the ZPD, children and adults or more capable partners engage in cooperative dialogues in which teaching and learning merge in a single integral process of joint performance" (Vialle et al., 2005, p. 60). It interesting to note that the verbs teach and learn are the same in Russian which is similar to the

idea of *ako* in Māori. The ZPD has been described as a site for the co-construction of knowledge (Newman, Griffin & Cole, 1989). The language and methods of this social interaction are then internalised by the child to use in subsequent independent performance.

Vygotsky's ideas have been further applied and adapted to become useful pedagogical strategies such as scaffolding, dynamic assessment, and reciprocal teaching. Situated learning, cognitive apprenticeship and communities of practice stemmed from new applications of his theories (Good & Brophy, 2008). These can provide a productive springboard of ideas for a teacher negotiating the curriculum. Also, the valuing of language, and paired and group strategies to support learning may have origins in his stress on the need for social interaction as an essential aspect of the learning process.

Bruner

Bruner's views of curriculum and learning also have relevance for curriculum negotiation. In the 1960s, Bruner promoted a structure of disciplines curriculum, often named the spiral curriculum, where students revisit ideas at intervals at more sophisticated levels over time (Lefrancois, 1997). He also identified students and the process of learning as important aspects of curriculum (Pinar et al., 1995). Bruner claimed we tend to make meaning though narrative ways of knowing. He is associated with learning by discovery and strongly supported constructivist understandings of knowledge. In the 1980s, following Vygotsky, Bruner (1986) moved from the lone child model of learning:

> to recognise that most learning in most settings is a communal activity, a sharing of culture. It is not just that the child must make his knowledge his own, but that he must make it his own in a community of those who share his sense of belonging to a culture. It is this that leads me to emphasise not only discovery and invention but the importance of negotiation and sharing - in a word, of joint culture creating as an object of schooling. (p. 127)

Subsequently, Bruner (2006) in his writing on education strengthened the emphasis on the importance and diversity of cultural settings. "Folk beliefs" about children's minds produced "folk pedagogies" which require careful examination.

"Different approaches to learning and different forms of instruction - from imitation, to instruction, to discovery, to collaboration - reflect differing beliefs and assumptions about the learner - from actor, to knower, to private experiencer, to collaborative thinker" (p. 163). This linkage of teachers' beliefs to their practice may be important as an aspect of teacher reflection and change.

Bruner (2006) argued, "real schooling … is never confined to one model of the learner or one model of teaching" (p. 171). This may provide an important counterpoint to the zeal of those who might advocate curriculum negotiation as a universal solution to pedagogical issues. He described four dominant contemporary models of learners' minds and teaching and learning (learning from imitation, didactic experience, through intersubjective interchange, and through distinguishing what is known canonically from what is known personally and idiosyncratically (2006, pp. 165-170) and suggested that the four perspectives on pedagogy were "best thought of as parts of a broader continent, their significance to be understood in the light of their partialness" (p. 172).

Bruner's (2006) analysis of current educational issues shows perspicacity. He celebrated the richer bequest we inherit in the divergence in theory of Piaget and Vygotsky, with the claim that "depth demands disparity" (p. 195). His own enduring pedagogical models draw on both. For example, inquiry or discovery learning utilised Piagetian theory of how children learn, and his notion of scaffolding, draws upon the ZPD of Vygotsky. Both are useful strategies for a teacher to employ in negotiating the curriculum.

Summary

In summary, the influence of these theorists continues beyond the century divide. Dewey brought the focus of education onto the child and their lives in the present. The stress on active, social experience as integral to learning was couched in arguments of what counts as educative. He has argued that schools should incorporate democratic practices so students can participate and learn the roles needed as members of a democratic society. Freire took a somewhat different approach to the politics of education. His focus was social change. He challenged

the style of education which reinforced oppressive aspects of the social status quo. His liberationary aim posits radically new and different roles for students and teachers. His notion of praxis, action and reflection suggested transformation was a possibility. Vygotsky had less of a classroom focus than the other three. However, his explanation of the importance of social, cultural and historical mediation to learning and development permeates current understandings in psychology and education. The stress upon the centrality of language and the social nature of learning interactions has generated many pedagogical applications and strategies. It is in this field of application of theory to curriculum and learning that Bruner has had a substantial influence. His spiral curriculum and inquiry model of teaching and learning persist. Furthermore, his analysis of education speaks of the complexity of learning, the broadness of the field and the need to be wary of simple solutions.

Between them, Dewey, Vygotsky, Freire and Bruner seeded major principles important to curriculum negotiation. All emphasise the importance of the social and cultural context, the social negotiation of meaning and learning, and the benefit of partnership between teacher and learner. They provide justification that learning is an active process important to the student's current life. These ideas continue to find credibility with teachers and to spawn new ideas, research and implications for practice. Some of these contemporary developments follow in the explanation of curriculum negotiation.

2.2 Contemporary theory and practice related to curriculum negotiation

Contemporary learning theory, in particular social constructivism, also contributes to the concept of curriculum negotiation. It would seem sensible that explanations about the nature of learning should underpin developments in teaching. In the description that follows, two models are used to represent the divergence in current cognitive epistemology. However, their application to teaching approaches should not be seen as producing mutually exclusive pedagogies, which would promote a false dichotomy - a common, but inadvisable practice

found in many current educational writings. The first model (sometimes termed *traditional*) assumes that learning is a receptive process for the learner (Woolfolk, 2004). The other assumes learning requires active construction of understanding by the learner (Agnew & Lodge, 2000; Brophy, 2002a; Good & Brophy, 2008; McInerney & McInerney, 1998; Woolfolk, 2004).

In the first model, expository teaching or transmission methods (e.g., as explained by Ausubel) are used to achieve meaningful reception learning (Lefrancois, 1997). The traditional reception-transmission pedagogical approach (Agnew & Lodge, 2000) focuses on "transmission of information through lecture, demonstration, and recitation methods" (Brophy, 2002a, p. ix) to foster student learning. Though the student role is commonly portrayed as passive, Ausubel would claim this is not the case. He argues that the learner must actively relate new material to their existing cognitive structures for learning to occur (Lefrancois, 1997).

In contrast to the reception model above, constructivism aligns more closely with curriculum negotiation. Constructivism is based on the premise that our knowledge of reality is always mediated through our perceptions, experiences, and previous knowledge (Simon, 1995). To clarify the myriad varieties of constructivism, a blunt distinction based on the process of knowledge development in the learner is often made between cognitive (radical) constructivism and more social orientations. The former, exemplified by the work of von Glaserfield, follow Piaget, and focus on the individual trying to make sense of their world (Simon, 1995). The latter follow Vygotsky and emphasise the importance of "shared, social construction of knowledge" (Woolfolk, 1998, p. 277). Learning is influenced by language and culture. The diversity within each of these categories is so considerable as to defy easy classification. Also, it is important to note that some deem both perspectives necessary to understand classroom learning (Cobb, 2005; Driver & Scott, 1995).

Agreement across constructivist views is claimed over four central characteristics of learning: "1) learners construct their own learning; 2) the dependence of new

learning on students' existing understanding; 3) the critical role of social interaction and; 4) the necessity of authentic learning tasks for meaningful learning" (Applefield, Huber & Moallem, 2001, p. 4). However, there are no set guidelines of how or what might comprise the teaching to develop such features (Simon, 1995). Curriculum negotiation is one approach to classroom learning which attempts to incorporate these characteristics, for example, in the attention given to the students' prior learning, and the use of discussion strategies.

2.2.1 What is curriculum negotiation?

The meaning of the term *negotiation* used here is the intentional involvement of students in classroom curriculum decision-making as first used by Boomer (1982b) in a collection entitled *Negotiating the Curriculum: A Teacher-Student Partnership*. Students work in collaboration with teachers to develop and then enact their classroom curriculum. This contrasts with the detailed descriptive work of the "interactionists" (Martin, 1976; Woods, 1983) of the 1970s and early 1980s, who focused on personal relationships and described schoolwork as a "negotiated activity" (Woods, 1983, p. 149). It broadens the scope of negotiation beyond personal interaction to deliberately consult and involve students in procedures about the classroom content and methods of learning.

The ideas which support curriculum negotiation arose out of questions about effective learning and teaching. In schools, "There is a clear tendency for children to become more acted upon than acting", despite human learning being essentially a collaborative process. Students need to "exercise their own powers and responsibilities" (Boomer, 1982c, pp. 2-3). The power of intentions is explained as how usually in the school the teacher's intentions prevail over those of the learner. He argued that the learner's powerful intention to learn is overridden by the teacher's motivational techniques and other strategies which may inhibit student learning. Teachers investigated ways they could share power and responsibility with students. This included how they might change to deliberately plan the classroom curriculum "with the complicity of the students" (p. 4).

Boomer (1982b) saw this student involvement as possible with students of all ages but to varying degrees because of contextual factors. Constraints to negotiation are seen as a pragmatic reality: no one is a completely free agent in school or in society at large. Negotiation requires the student to learn actively and emphasises learning how to learn. The relationship between learner and teacher is one of mutual interdependence. The negotiation can involve establishing prior learning, what will be learnt, how this will be done, and how the achievement of the learning will be assessed.

Negotiation was explained as:

> All the parties in an operation come together, bringing with them their own points of view, needs and wants, and together they work for the outcomes most satisfactory to all concerned. In educational terms, the result of negotiation may come to a meshing of minds, an interlocking of intentions, an agreement about means and ends between teachers and learners. The focus is on bringing about the best possible learning for learners. (Cook, 1992, p. 15)

Curriculum negotiation is grounded in the principle of ownership. In extending this to educational contexts, it involves viewing students as "capable as decision makers, intenders, owners of their own ideas, willing partners with their teachers in the active pursuit of their own learning" (Cook, 1992, p. 15). Negotiating offers "the best chance of maximising" classroom learning. Cook (1992) said:

> Learners must be educational decision-makers. Out of negotiation comes a sense of ownership in learners for the work they are to do, and therefore a commitment to it. Learning is an active process. Teachers can't do it for learners. Information may be imposed, but understanding cannot be, for it must come from within. Students learn best when they want to. They want to when they are doing it for themselves, as a result of their own needs. Active (i.e. intentional, participatory) involvement in classroom decision-making and in the enactment of the decisions, results in more effective learning than does the passivity that attends the performance of a teacher's imposed pedagogical pattern. (p. 16)

Cook (1992, p. 16) provided views of "many hundreds of teachers and students" by the language and learning curriculum development team in Western Australia in the 1970s. Unfortunately, the information provided about this research is

inadequate. The duration of the research, the actual number of participants, the ages of the students, how the questions were asked, and any other documentation of the data are not provided. When students were asked to describe what helped them learn best, they identified three major conditions: engagement, exploration and reflection. Engagement covers interest, purpose, knowing what and why, having intention and relevance: the content of learning. Exploration includes using varied ways of learning, active trialling, risk taking, varied groupings, support from the teacher: the learning process. Reflection means recognising what we have achieved, sharing our learning and its implications, assessment and evaluation, and deciding what "new questions, challenges and directions emerge" (Cook, 1992, p. 18).

It is noted in the literature (Boomer, 1992c; Cook, 1992) that meeting these requirements for a whole class of learners at one time can be a major practical problem for teachers, an almost impossibly complex task. Also, constraints impinge upon teachers such as an imposed curriculum, school timetable, resourcing and room scheduling, all of which may reduce flexibility. The acknowledgment of the constraints, the non-negotiable, to the learners is the first step in the process (Cook, 1992). From there, Cook urges that students must be involved as together they negotiate what might be possible to optimise learning.

2.2.2 The underpinning principles

The idea of students taking an active role in decisions about what, how, when and how well they are learning is not new as the previous section of this chapter on the antecedents explained. The idea is congruent with several of the major curriculum and learning ideologies and discourses of the 20th century and even earlier: child-centred learning, progressive education, critical pedagogy, feminist theory, and postmodern curriculum theory (Pinar et al., 1995). It represents a major challenge to teaching and learning as transmission (what Freire referred to as the banking metaphor). This idea is also referred to as the "school lunch" metaphor by Erickson and Shultz (1992, p. 467), the learner as spectator (Eisner, 2000), and the "frontal teacher" (Brophy, 2002a, p. ix). Boomer (1992b, p. 6) used a pharmaceutical metaphor, with the learner's mind as a passive receptacle

of the teacher's prescribed dosage of knowledge. Multiple reasons underpin the need to negotiate the curriculum with students. They include beliefs about how learning occurs, democracy, social justice, and student rights.

Learning is collaborative

The advocates of curriculum negotiation presume a *social constructivist* understanding of knowledge which emphasises its construction through social interaction (Good & Brophy, 2008). The usage of this term and *sociocultural* in the literature is contested. Many writers (Brophy, 2001a, 2002b; Nuthall, 2002; Wells, 2002) use the two terms interchangeably. Others characterise sociocultural as a subset of social constructivism which incorporates more of Vygotsky's ideas about culture and learning. Yet others however, such as Rogoff and Gipps, distinguish the sociocultural position as characterising the interdependence of the individual and the social context as transformative (i.e., learning), rather than merely an influence on learning (Sewell, 2006). The interactions are bi-directional or reciprocal in influence. Both teacher and learner are changed in the process.

In the introduction to Boomer (1982c), Campbell labelled curriculum negotiation as a "theory of the environment of learning" (p. 6). Its direction is pragmatic. It is close to the "natural learning model of parent and child." In the interaction between teacher and child, both are learners and are constructing meaning together. It assumes that learning is "essentially collaborative", and may depend a lot on the learner's ability to learn *how* to learn. It calls for active learning from the student. It attempts to break the teacher-centred mould of education.

Negotiation can involve content, methods of pedagogy, modes of learning, methods of assessment and reporting, classroom behaviour and co-curricular activities. It can encompass all the areas of decision-making within a teaching-learning programme (Boomer, 1982b; Boomer et al., 1992; Holdsworth, 1999). It is an acknowledgment that teaching and learning is a dialogue between participants and that the interaction between them can build shared intent which can bring better quality learning (Holdsworth, 1998). It also assumes that both the learner and teacher have responsibilities in the learning process.

Curriculum negotiation is sometimes portrayed as a remedy for youth who are alienated and not engaged in their schooling (Beane, 1997, 2005; Hargreaves, Earl, Moore, & Manning, 2001; Rabone & Wilson, 1997; Woods, 1996; Yair, 2000a, 2000b). The need to negotiate also appeared frequently in suggestions related to an appropriate curriculum for early adolescent students or middle schools (Black, Madden, & King, 2000; Cormack, 1995, 1999; Cumming, 1994, 1996; Holdsworth, 1996; Ward, 1997). Negotiation was seen as a proactive way of developing a curriculum that is relevant, which students own, where their questions have import, which enhances their learning and the classroom climate because they are motivated, have control and are responsible for their learning (Cook, 1992, p. 16). Cook (1992) explained engagement as having characteristics of learner intent, internal motivation and relevance. Research is beginning to demonstrate that curriculum negotiation is effective in developing these aspects of a learning situation (Boomer et al., 1992). The literature from Australia in *Connect* is a rich source of further descriptive accounts of how curriculum negotiation can work in this way, though given this journal's purpose of supporting student participation, one may question whether it is sufficiently critical.

Other studies, however, confirmed positive influences of negotiation on students' engagement. Yair (2000b) focused on how the structure of instruction in schools affects learning. He argued that much of current school life was boring and alienating to students; in the main schools are not set up to motivate learning. Yair made a secondary analysis of data from a longitudinal study of youth in the USA (begun in 1993) across 33 schools, 865 randomly selected students, and 28,193 learning experiences. Data had been gathered using the Experience Sampling Method designed by Csikszentmihalyi, which relies on student self-report about the experience they are having at the time. He found that students' learning experiences were optimized when instruction was authentic (i.e., has importance for their immediate and long term aims), challenging, demanded skills and allowed for choice and student autonomy. This effect was achievable at the classroom level, given the contextual variations. These findings support several of the underpinning principles of curriculum negotiation. In another study, Bennett

and Ba (1996) invited students to evaluate an alternative assessment system which involved performance, self assessment, and explanations of their learning to peers, teachers and parents. Students identified ownership, maturity, responsibility, improved confidence, and motivation to learn as the spin-offs of such a structure. Reporting a case study of one teacher, Rabone and Wilson (1997, p. 16) also reported increased "student pride, motivation, participation and performance" when a negotiated curriculum replaced a traditional transmission instructional system in an unmotivated and intimidating class. Of import was the improvement to the teacher's feelings of commitment and confidence in her teaching. The small scale of the latter two studies should be noted when evaluating the transferability of their findings.

Having a curriculum which is relevant to students was often mooted as important to improvement of student learning (Cook, 1992; Luke & Hunter, 2000/2001; Page, 1998; Shields, Bishop & Mazawi, 2005). However, the notion of relevance is problematic. Rudduck and Flutter (2000) recalled lessons from the 1970s curriculum developments in Britain that may not yet have been understood: Relevance is a concept that was used to persuade teachers that the content would appeal to the students. However, it was the "adult's view rather than the pupil view of what was meaningful for young people" (p. 84). Research by Page (1998) illustrates this distinction. To operationalise relevance is complicated and the assumptions that underpin a "teacher-only" view of a relevant curriculum may be patronizing and wide of the mark. The students in this case study of a history class, revealed their disengagement with the "relevant" curriculum which was intended to be meaningful to them in the underlife of the classroom. While in silence students supposedly found answers to a quiz, in reality they surreptitiously followed their own agenda of "sharing answers, listening discreetly to Walkman radios, doing other homework, passing around food, passing around notes" (p. 8), and so forth. Another example is found in a study of integrated curriculum as part of curriculum reform in Ontario in the mid-1990s. Hargreaves et al. (2001) interviewed 29 teachers who identified relevance as having three major forms: relevance to the work, to personal development and relations, and social and political contexts. However again, the majority of examples cited seemed to be

teacher-initiated and conceptualized, rather than meeting Beane's (1997) criterion of authenticity as coming from students' interests and concerns. The negotiation of curriculum with students would possibly assist teachers in the way they understand their students and their learning.

Much school learning seems to lack pertinence to students' current lives. Holdsworth (1997b) noted the deferred nature of the purpose of learning as problematic. He argued that it devalued students' current situation, experiences, and knowledge. He suggested that student participation required activities that are valuable to the students, the community and the curriculum goals. Moreover, links are needed to life in the world: what Luke terms "connectedness" to students' economies, cultures and communities (Luke & Hunter, 2000/2001, p. 36).

The principle of democracy

Curriculum negotiation is believed to be a "crucial component of a democratic classroom … a cointentional, collaborative process of learning and teaching designed to provide a climate for promoting democratic schooling" (Lester, 1992, p. 202). It is a way of questioning the status quo. In democratic countries many expect that education should model democratic principles requiring a participative role for the learner (Levin, 1998). This includes the students taking an active role in determining the content, learning processes, assessment and evaluation of the curriculum. Moreover, such an ethos of participation would be reflected in the wider school community. However, evidence of such involvement is scarce, and whether it is widely achievable is debatable. Major systemic change may be required.

Democracy for minority groups, however, is a vexed and on-going issue. The underachievement of some minority groups is one concern attributed by some to the deficit thinking displayed in some teachers' conceptions of minority students. That is, teachers tend to blame students' failure at school on internal shortcomings or social deficiencies in their backgrounds. As one way of addressing deficit thinking, Shields et al., (2005) argued for a *deeper* conception of democratic education. This went beyond "one person, one vote", which they claimed

perpetuates the marginalisation of groups who are in a numerical minority. The crux of this deeper understanding of democracy is that "various participants bring different knowledges to the table - perspectives that must be understood if decisions are to be deeply democratic" (p. 135). The new positioning needed to begin this task requires teachers who "will take time to listen to our students, to get to know them, to build on their knowledge of what it is that helps them to be successful in school" (p. 154). Such a perspective gives current and urgent emphasis to the development of approaches to teaching and learning such as curriculum negotiation that attempt to implement such concepts.

Socially just

Critical pedagogy exposed the reproductive and reinforcing nature of schooling in terms of social inequalities (Apple, 1982; Aronowitz & Giroux, 1991; Giroux, 1988). The importance of the broader social and political context of curriculum is acknowledged by many who promote negotiating the curriculum (Boomer, 1992c; Hyde, 1992b; Lester & Boomer, 1992; Onore & Lubetsky, 1992). However, some argue there is an inadequate explanation of what this means in action in the classroom for the teacher, the "transformative intellectual", and their class (Onore & Lubetsky, 1992, p. 254). Some have portrayed curriculum negotiation as one possible example of what can be done in the classroom. Grundy (1987), for instance, viewed a negotiated curriculum as an example of emancipatory education. She cited Boomer (1982b) as a source of case study examples of varying quality. It is important to analyse the authenticity and extent of the claims made about negotiation. For example, in her opinion, some only qualified as "'contract learning' … a pseudo-sharing of power, for student decision-making operates only at the level of choice within options" (p. 123); whereas others were exemplary. In her view, liberating education is dialogical: teachers and students have both the right and the responsibility for contributing to curriculum content and the learning process:

> An instance of the concept of collaboration in curriculum praxis is the idea of the negotiated curriculum … of the form and content … to share control of the development of learning through sharing theories of learning and curriculum construction with students. In these situations of negotiated learning students were emancipated from dependence on the teachers' ability to diagnose appropriate

> learning experiences. By reflecting upon their own individual and collaborative processes of learning, students were better placed to take control of the construction of their learning. (pp. 122-123)

The inward-looking perspective of Boomer's earlier version of negotiation, which portrayed the content of the curriculum as potentially ready-made, was challenged by Onore and Lubetsky (1992). They stressed the need to negotiate the what, how and why of what is to be learnt. They used the metaphor of the curriculum as a community to link critical and humanistic ideas:

> Community-building is a struggle about possibilities, those of coming to see ourselves differently, seeing others in new ways, and seeing ideas as opening up potential spaces for inquiry. Further, if what occurs in the classroom is connected to what happens outside the classroom … then community-building has implications for the ways things can be outside the classroom. (p. 257)

They suggested the resolution of individual and group needs lay in "being able to see correspondences between the satisfaction of our own needs and the missions and goals of the group" (Onore & Lubetsky, 1992, p. 257). Caring, concern and trust support the community focus on what it can become.

Their portrayal of curriculum as "a radical middle" attempted to explain the meeting place of teachers, students, their cultures and lived experiences with the traditional disciplines of school knowledge. They saw this as being close to Dewey's vision of progressive schooling, amalgamating past and present. What emerged was a "transformed territory of meaning, containing elements of each but not simply a union of them. What results is a space which has changed each of them in the process of being constructed" (Onore & Lubetsky, 1992, p. 262). This transformative idea links closely with Rogoff's (2003) understanding of learning as the social and cultural context constituting, not just influencing, learning. The "radical middle" helped connect the classroom and the social and political world outside, and stressed the totality of the experience of curriculum as a shared enterprise.

Rights: Sharing of power and control

The silence of students' voices in decisions about their education is a long-established tradition in mass education. In stark contrast, the arguments stated above regarding social justice, democracy, and the nature of learning combine as an imperative for a participatory role for students in their education. In addition, under the Rights of the Child in the United Nations Convention on Human Rights (United Nations, 1990), there is a clear requirement that students must have the opportunity to participate in decisions about their education (Rudduck & Flutter, 2000).

Also in New Zealand for Māori, the Treaty of Waitangi principle of *rangatiratanga* is explained as "the right to determine one's own destiny … and pursue means of attaining that destiny" (Bishop, 2008, pp. 154-155). Such a principle could be interpreted as extending the opportunity to Māori students and their parents to become involved in decision-making processes about classroom curriculum and learning processes.

Sharing power in classrooms is central to curriculum negotiation. It requires teachers to challenge aspects of traditional practices that maintain their authority and power. Hyde (1992b) made explicit links to critical pedagogy as her practice of curriculum negotiation developed. The interplay between her practice and theoretical learning refined her understandings of "society, power, ideology, schooling, privilege, inequalities, labor power, and about how society is formed and transformed" (p. 68).

The foundational principles of curriculum negotiation described in this section are broad ranging. They begin with a particular understanding of teaching, learning and curriculum-making as a collaborative process between teacher and students, rather than teacher imposed. The focus on the thinking, experience and questions of learners is central. It is argued that this can assist with the issues of relevant content and student participation often described in schools. However, the questions of how an education can be democratic, socially just, and give more power and control to students are also pertinent to conceptions of curriculum

negotiation. Cook (1992) suggested that the movement to negotiate must be driven not by individual teachers but at a school and system level. This raises questions about whether the discourse of policy documents makes reference to similar concerns. In the following section the stance in the New Zealand curriculum is explored.

Policy backing?

In New Zealand, some aspects of the discourse of *The New Zealand Curriculum Framework* (MOE, 1993) and the subsequent individual curriculum and support documents seemed to encourage, indeed require negotiation. The curriculum's foundational principles stated the premise that the individual student is at the centre of all teaching and learning (MOE, 1993). This would suggest a child-centred focus.

Within the essential skills section, there are parts where the vocabulary used fits with some of the dispositions valued in curriculum negotiation. For example, under headings such as communication, problem-solving, self-management and competitive skills (which suggest a considerable measure of student independence), decision-making and responsibility are to be developed. Likewise, learning and teaching programmes are to provide opportunities for self-monitoring and self-evaluation and enable students to set goals for themselves-student autonomy is encouraged. However, the context of the usage of these terms seemed to promote a strong self-management focus rather than include stress on interaction and collective responsibility.

In contrast to the very individual focus of this discourse, one of the learning areas provided a rather different flavour. In *English in the New Zealand Curriculum* (MOE, 1994), the characteristics of learning and teaching English section provided the following directives:

> *Language programmes should be learner-centred* (p. 10).
>
> *Language learning requires interaction and active participation.* Successful language learning and development require students to be active participants in learning. This includes interaction between teacher and learner and between learner and learner.

> Teachers should use and monitor the effectiveness of such collaborative approaches.
>
> *Language is best developed when students understand and control the learning processes*. Students should increasingly take responsibility for their own learning, work independently, and transfer their skills and knowledge to new learning. The clear structure of the English curriculum will facilitate their understanding of their own progress.
>
> *Language and knowledge about language develop principally through use*. Students learn best when they are engaged in purposeful tasks and have a variety of satisfying experiences. The focus of programmes should be language in use within authentic contexts which are relevant to the learner and which include the learner's own experiences. (p. 11)

These lay out significant messages about the importance of student participation, social interaction, and relevant student experience, as well as student control and autonomy, all of which are fundamental to curriculum negotiation.

The supporting document *Planning and Assessment in English* (MOE, 1997b) detailed what negotiation meant. Directives included "Where appropriate, students should also be involved in planning" (p. 9). Then suggestions are given about what students can do in planning; reflecting and monitoring; and recording and reviewing. Negotiating the curriculum was explained, its underlying beliefs listed, and its characteristics described (pp. 45ff). Four key questions are given to help establish the climate for effective negotiation. These questions are identical to those used by Cook (1982, p. 140; 1992, p. 21) to plan units of work with students: "*What do we know already? What do we want, and need, to find out? How will we go about finding out? How will we know, and show, that we've found out when we've finished?"* However, no reference was provided. In another learning area, technology (MOE, 1995, p. 28), there was a directive that there "should be flexible, open, collaborative approaches to classroom teaching which accommodate all students' perspectives, interests, aspirations, and learning styles. An appropriate technological activity will require thoughtful planning and negotiation between students and teachers."

The preceding discourse suggests, at least in the learning areas of English and technology, that New Zealand teachers should have construed an invitation to negotiate the curriculum. In the new New Zealand curriculum, to be fully implemented by 2010, the support for negotiation is even more explicit. For example, teachers are given guidelines on pedagogy which are quite open about the importance of collaboration with students:

> Learning is inseparable from its social and cultural context…. Teachers look for opportunities to involve students directly in decisions relating to their learning. This encourages them to see what they are doing as relevant and to take greater ownership of their learning…. Students learn as they engage in shared activities and conversations with other people … by cultivating the class as a learning community … everyone, including the teacher is a learner; learning conversations and learning partnerships are encouraged. (MOE, 2007b, p. 34)

I believe that many teachers in New Zealand, particularly in primary schools and in secondary subjects such as English, social studies, and art, have negotiated the curriculum with their students for many years. However, little New Zealand research to document this process was found. This section has explained the underpinning principles of curriculum negotiation and explored the visibility of the ideas in New Zealand curriculum documents. The following section explores the potential confusion that might ensue from the usage of a wide variety of terms to describe very similar principles.

2.2.3 Diverse interpretations of theory in practice

The current literature on curriculum and pedagogy has many references to child-centred pedagogy, social constructivism and strategies that seem to require curriculum negotiation. Despite this there was a limited amount of literature that described the theoretical principles and their implementation using the terminology curriculum negotiation. Boomer and Beane were dominant in the literature in the 1980s and 1990s of students negotiating their curriculum: Holdsworth (1997a, p. 2) used the term "pioneers" to describe them, which would suggest that at that time this practice was not widespread. However, such a claim does ignore important antecedents such as Dewey.

The variation which characterises the implementation of the theoretical principles of curriculum negotiation was stressed by Boomer et al. (1992). Within the existing literature that described *how* teachers might negotiate (Boomer, 1982b; Boomer et al., 1992; Holdsworth, 1998, 1999; Wilson, 2000), the predominant template was a description of how curriculum negotiation was conceptualised by the author (often a teacher). For example, Cook (1992) described a model methodology to negotiate the curriculum which involves four steps represented as questions (cited above in 2.2.2), whereas Wilson (2000) used a questionnaire to initiate the process. This was often followed by action research type case studies of implementation in their classroom or in others, which reflected the learning involved. The limitations of such literature include the lack of theoretical explanation and discussion, and because of their promotional intent, usually a lack of criticism.

However, as explained above, terms used almost synonymously with curriculum negotiation were abundant in the literature. Examples included *collaborative curriculum making* (Zellermayer, 1997), *student participation* (Holdsworth, 1999, 2000) and *community of learners* (Brown & Campione, 1996). A small selection of this literature follows. The aim is to provide a range of examples of the diverse interpretations which draw on very similar, if not identical understandings and explanations of learning and pedagogical theory. Where possible research-based New Zealand studies are used. The following six examples are briefly described: Zellermayer's collaborative curriculum-making; Brown and Campione's communities of learning; Beane's integrated curriculum; Bishop and Glynn's culturally-responsive pedagogy; Agnew and Lodge's co-constructivist model of teaching and learning; and Wood's breakthroughs in learning.

i. Collaborative curriculum-making

Collaborative curriculum-making was studied by Zellermayer (1997), who defined the concept in a Deweyan sense, following Boomer (1982b), "both teachers and students bring their experiences and understanding to an instructional situation that focuses on inquiry rather than control" (p. 187). Research was undertaken in writing classes in an Israeli high school and aimed to make more

sense of what was deemed a taken-for-granted notion and its implications for teaching. Among strategies used were student group work and teacher-student conferences. Peer collaboration was encouraged when help was needed. The research drew on data from three taped conversations with five individual teachers of their accounts of collaborative curriculum-making, and field notes from staff development meetings. It did not however, include any classroom observations.

Case studies provided an interestingly varied understanding of what collaborative curriculum-making meant for each teacher. The recurrent themes found were: letting go of control and one's old image as a teacher; noticing and trying to take a student's perspective; making connections between life and school; respecting the students' space and ownership of their work; and the simultaneous orchestration of different activities. Three common areas of focus between the teachers were selected: teacher authority and student responsibility, the significance of students' personal/cultural knowledge, and the teachers' valuing of their point of difference with their non-participating colleagues. The size and scope of this study was certainly limited. Nevertheless, it provided a range of perspectives which would be of interest to teachers attempting collaboration.

Zellermayer (1997) notes that some writers, such as Hargreaves and Bleich, have argued that collaborative techniques are often no more than "contrived collegiality" (p. 187), or another strategy to get students to write; similar to what Grundy (1987) calls contract learning (see 2.2.2 above). They claim that when used as a technique, collaboration is more dangerous than traditional teaching because "it masks asymmetrical power relations in the classroom" (Zellermayer, 1997, p. 187).

ii. Community of learners

A community of learners is another formatting of the pedagogical ideas at the heart of curriculum negotiation. Brown and Campione (1996) described a community of learners where students in a social studies programme were

involved in designing their units, and jigsaw[1] was used as a means of structuring students to teach each other about a topic. In an active learning environment, students helped each other as meaning was co-constructed. The students were described as *cognitive apprentices* to the teachers and each other; expertise was distributed throughout the class. According to the authors, students were learning the skills of "independent and collaborative research" (p. 125), which through repetition and practice would become part of their own repertoire. Students were answering their own questions, not those posed by a teacher. This model drew on experience with reciprocal teaching, where a teacher and students take turns at "being the teacher" in leading discussion in reading comprehension. It used cooperative groups to effect joint construction of meaning showing the influence of Vygotsky's zone of proximal development.

The community of learners model explained above, was just one of many diverse designs which have emerged from Wenger's (1998) notion of a "community of practice". Sewell (2006) categorised their variations as related to parental involvement, pedagogical strategies, computer mediation and discourse. She provided a recent qualitative example of developing a community of learners in three classrooms of a primary school in New Zealand, using Rogoff's (2003) institutional, interpersonal and individual lenses. Detailed case studies provided strongly distinctive examples of teachers and students working in this way. The processes and difficulties that might ensue were made visible. Limiting factors included the difficulties for teachers in understanding the approach and in letting go of traditional perspectives of teaching and learning. However, Sherin, Mendez and Louis (2004) questioned the community of learners model in relation to its efficacy across all disciplines.

iii. Curriculum integration

Curriculum integration is a system which draws strongly on similar underpinnings to negotiation. Recently Beane (1997), in the USA, developed a theory of

[1] A strategy where students are grouped to learn aspects of a topic, then return to teach their colleagues in their original group. Each student takes responsibility for part of a topic.

curriculum integration across subject areas. Curriculum negotiation is at the heart of this and it uses students' questions as the starting point in determining curriculum content. The ideal of democratic classroom communities continued to feature strongly in this approach, which revealed the separate subject curriculum as inevitably teacher-dominated (Beane, 2005). Largely positive results have emerged from research on the implementation of this approach across several countries including New Zealand (Apple & Beane, 1999; Beane, 2005; Brodhagen, 1999; Edwards, 1994; Edwards & Pimpini, 2000; Fraser, 1999; Hargreaves et al., 2001; Harwood & Nolan, 2002; Roberts, 1998; Whyte, 1999). However, some concerns were evident especially related to the many changes required in the teacher's role (Fraser, 1999; Whyte, 1999) and the impact of institutional structures (Edwards & Pimpini, 2000).

An issue sometimes raised about integrated curriculum is its fit with the state-mandated curriculum, a point of accountability for schools and teachers. Roberts (1998) reported an initial research study into middle school curriculum in Australia which followed Beane's methodology. He found that it was possible to achieve a reasonably close match between the questions generated by young adolescents and the prescribed state curriculum. However, he described "student-centred curriculum design within curriculum frameworks" (1998, p. 74) as an area that would benefit from further research. Negotiated curriculum integration was seen as an effective way of finding content relevant to students, and minimising alienation.

iv. Culturally-responsive pedagogy

A pedagogy that is culturally responsive emphasises particularly the partnership and altered power relations in curriculum negotiation in an attempt to affirm culture. Bishop and Glynn (1999) examined the context of New Zealand education with particular regard to the positioning of Māori students. They proposed that their education should be more learner-centred, as in a discursive classroom with "the learner as pedagogical partner, rather than pedagogical object. The pedagogy is consciously co-constructed" (Young, 1991, p. 87). Bishop and Glynn (1999) summarised the views of several other scholars to

explain the power change in this teacher-student partnership as a process of cultural affirmation. Permitting students to help shape the content, processes and language of the classroom changes the teacher-student relationship from an all-powerful teacher position in regard to the curriculum and instruction, to a dialogical relationship in which teacher and students co-construct these.

Bishop and Glynn (1999) drew on Māori metaphors to suggest what might characterise a culturally-responsive pedagogy of power-sharing. From *tino rangatiratanga* (self determination) was the suggestion of student participation in decisions about curriculum content and direction. *Ako* suggested reciprocal learning; teachers are not the only source of knowledge. The pedagogy would be "holistic, flexible and complex" so students can bring and present themselves in their diversity and complexity in a classroom based on *whanau*-type (family) relationships (p. 170).

Narrative pedagogy was suggested as one means of creating such power-sharing relationships. Lauritzen and Jaegar's model (1997) was used as an illustration of students growing from their prior knowledge:

> [It] allows students to co-construct curriculum content through negotiation between themselves and their teachers. In this way, students and teachers learn to negotiate ways and means of developing strategies for investigation and exploration, as well as ways of interpreting and representing their findings. (Bishop & Glynn, 1999, p. 184)

The joint nature of these processes was emphasised: The curriculum is planned *with* rather than *for* students. Also, other pedagogies such as problem-based methods and curriculum integration were endorsed as a means of achieving the envisaged objective.

An Effective Teacher Profile was subsequently developed by Bishop et al. (2003). This was based on interviews with 70 Y9 and Y10 Māori students about their classroom experiences. It included a research tool that categorised teacher actions in the classroom using a continuum of actions ranging from those characterising a traditional classroom, such as instructing and monitoring, to those of a discursive

classroom. The tool identified with reasonable clarity a range of teacher actions for an observer to categorise. However, there were areas of ambiguity in the way that the term co-construction was defined and used (see also Chapter 3.3 and Chapter 5). Over time in *Te Kōtahitanga* research project, a culturally-responsive pedagogy of relations was developed which incorporated careful attention to student and teacher power positioning, co-construction and rejection of deficit theorizing (Bishop, 2008). This PD model continues to be refined through feedback from participant teachers and students, and student achievement measures. Its wider distribution in New Zealand secondary schools with Ministry of Education backing would suggest it has shown substantial merit.

Critique of the third phase of the project by Openshaw (2007), commissioned by the Post Primary Teachers' Association (PPTA), suggested the claims of the project's success were not conclusively proven by the data. For example, other initiatives operating in schools alongside *Te Kōtahitanga*, such as the numeracy and literacy projects may have contributed to improvements in student outcomes. He also queried some of the key assumptions underpinning the project, suggesting that the claims overstated the capability of teachers to change student achievement, and understated other effects such as social economic status (SES) and family values. There was a strong discourse of teacher blame in relation to deficit theorising about Māori students which he claimed was based on "flimsy evidence". Also, there was a lack of acknowledgement of the considerable history of such ideas as "power-sharing, co-construction of curriculum and positive relationships in the classroom". Moreover, Openshaw claimed that data collection processes were seldom viewed as "transparent and rigorous". However, the pedagogical model central to the whole project was highly rated by participants.

v. Co-constructivist model of teaching and learning

The co-constructivist model of teaching and learning stresses the partnership that is central to curriculum negotiation. Described as a much less familiar model than constructivist or transmission models (Agnew & Lodge, 2000), it had a more collaborative than individual view of learning, "allowing learners to identify issues in their organisation and society which affect their learning and well-being

and then to act to bring about changes" (p. 11). The role of the teacher was to initiate a dialogue between and with the students, based on their common experiences, and students were expected to be active participants. Teacher-student relationships were viewed as less "hierarchical, boundaried and fixed" (p. 12), compared with the more formal transmissive classrooms. Through the process of individual, group and organisational change shifts in the balance of power and social change would result: ideas which originated with Freire. Grundy's (1987) explanation of the emancipatory interest and curriculum was quoted (p. 12), providing a direct link to curriculum negotiation (see earlier in this chapter: 2.2.2).

Dialogue was pivotal to such learning. It was characterised by "equality, sharing, spontaneity, collaboration and reciprocity" (Carnell, 2000, p. 47). Transformation was claimed to occur in and through dialogue. The reciprocity of influence between learner and teacher was used to blur the distinctions between learning and feedback, which dialogue enabled. Responsibility for learning was shared. Feedback was an integral part of the learning:

> The relationship is no longer one where the expert informs the neophyte of their judgement, but one where the roles of learner and teacher are shared and the expertise and experience of all participants are respected. All parties to such dialogues have an expectation of learning. (Agnew & Lodge, 2000, p. 13)

In this collaborative learning community "learning is shared and socially constructed…. Co-construction is grounded in the assumption that learners are teachers and teachers are learners" (Carnell, 2000, p. 48). This latter claim requires careful clarification. Askew and Lodge (2000) considered it would be difficult to implement such a pedagogy in the UK currently because of the restricted nature of teacher decision-making. However, they suggested aspects of the approach such as co-constructive dialogue between peers could be used.

vi. Breakthroughs in learning

Whereas most research reported how teachers set up structures to facilitate curriculum negotiation (Apple & Beane, 1999; Brown & Campione, 1996; Holdsworth, 1997b, 1999), Woods (1996) searched for examples already existing

in schools. He called them "breakthroughs in learning". The characteristics of student ownership, control, creativity and relevance to students' needs were strikingly similar to the learning processes that typify curriculum negotiation. The analysis of conditions that favoured breakthroughs occurring confirmed this concurrence: The management structure was democratic participation and the underlying learning theory was social constructivism. Students were involved in the control and evaluation of their learning. The central aim of the curriculum was the "promotion of the students' well-being as a self-determining citizen" (p. 138). Teachers with a social justice agenda were essential to co-create such learning.

The six pedagogical models outlined above employ similar discourses about their underpinning ideologies of curriculum, learning, social justice and democracy. Partnership, power-sharing, co-construction, and community are emphasised with particular importance being placed on certain aspects dependent on the prime concern of the authors. For example, Brown and Campione stress community, Bishop cultural responsiveness, Beane integration across subject areas, and Agnew and Lodge the co-constructive nature of the learning process. The divergence in foundational ideas seems relatively minor, which might suggest similar implementation. Each of these aligns with or is a synonym for curriculum negotiation.

Terminology choice

The range of terms used, however, invites confusion. An important aspect of a decision about terminology is the understandings that one's audience already has of it. In this thesis a change of terminology was made from curriculum negotiation to co-constructive pedagogy for this and other reasons. The term *curriculum* has, for most people, a meaning of a static entity of what is to be studied. The MOE sets this out in the *Curriculum Framework* and the subject documents. The curriculum is not commonly understood as being negotiable.

Co-construction emerges strongly from the theoretical influences of Dewey, Freire, Vygotsky and Bruner. Vygotsky's view of learning as culturally, historically and socially mediated has had a major influence on development and

learning theory from the 1980s (Valsiner, 1988; Vialle et al., 2005; Wertsch et al., 1995). The term co-construction has been used to express the joint sociocultural nature of learning - the partnership between teacher and learner - as in the title of Boomer's first edition of curriculum negotiation. It makes overt the view of knowledge as social constructivist. It emphasises the learning process rather than the curriculum. It also enhances the cultural aspect to learning which was implicit but not strongly emphasised in earlier explanations of social constructivism. Gay (2000) and Bishop and Glynn (1999) use the term to explain culturally affirming practices in the search for a culturally-responsive pedagogy of power-sharing. It puts the emphasis on the joint process rather than on the product.

From this point in this thesis a *co-constructive approach* or *co-construction* is used to convey the understandings thus far covered by the term curriculum negotiation. However, where curriculum negotiation was used in the existing literature it is retained.

2.3 The influences on co-construction in practice - areas of potential tension

The topics that follow relate to some salient influences on co-construction. They investigate some of the tensions that may arise when attempting to co-construct. The first issue to be discussed is the school as a setting for learning. This is followed by a discussion of literature relevant to teacher and student roles.

School settings

First, some of the structural and procedural factors that characterise the school as an institution and influence the processes of change in teaching and learning are explored. Second, the school as a location for learning is compared with everyday settings; then the secondary school setting as a particular context is evaluated.

To implement a classroom based on co-construction may not be easy because of the constraints of the school environment. How a school and its community perceive teaching and learning can impact greatly on whether co-construction is

supported. Some claim that over the last century schools have been slow to change to any substantial extent (Boomer, 1992c). Two of the forms of analysis used to explain this phenomenon are "macro" or structural, and "micro" or personal. Structural explanations located the inertia of education in its industrial past (Boomer, 1992c). The durability and endurance of structural characteristics of schooling, in architecture, systems and staffing hierarchies, provide a familiarity across time and places (Boomer, 1992c; Tye, 1989). In contrast, Gore (1998), following Foucault, attributed the similarity, continuity and longevity of practices, across sites and over time to the "micro" level of personal interactions. Gore attributed this "apparent continuity in pedagogical practice … to … power relations, in educational institutions and processes, that remain untouched by the majority of curriculum and other reforms" (p. 232). She used a Foucauldian analysis, across four different educational sites, to identify eight techniques of power. These were surveillance, normalization, exclusion, classification, distribution, individualization, totalisation and regulation. It is useful to combine an understanding of how both the structural environment and interaction patterns contribute to resistance to innovation and change.

The environment in which learning occurs, impacts on many aspects of the learning experience. There are extreme differences in learning in an everyday one-to-one relationship, such as child and parent, and learning in a school setting, with one teacher and up to 30 or more students. The way schools were structured in regard to class and room sizes has forced teachers and schools to adopt certain management routines and rituals (Nuthall, 2001). These include: students grouped by age or ability, whole class instruction, examination, competition, homogenous curriculum, rewards and punishment and a predominantly transmission model of teaching (Erickson & Shultz, 1992). Curriculum negotiation was perceived by proponents as an attempt to move closer to a more natural, everyday, transactional model of learning (Campbell in Boomer, 1982c) in the way students are involved in decision-making about curriculum, the view of the learner as capable of learning most things, and the concern for authentic, relevant experiences as the focus of learning (Erickson & Shultz, 1992).

Secondary schools have deeply embedded structures that make implementation of co-construction more awkward than in primary schools. The rigid categorisation of the curriculum into subjects, students moving frequently from class to class, assessment for qualifications, and the use of a rigid timetable are identified as possible constraints (Boomer et al., 1992). The timetable has been described as the greatest distinction between primary and secondary education when trying to implement change (Edwards & Pimpini, 2000). The basis of such scheduling seems strongly intertwined with subject specialization and the need for time for each. It could be argued that the 1993 *Curriculum Framework* with its clear learning areas may have strengthened the focus on subjects and hence increased the inflexibility of timetabling.

Constraints seem to be related to some teachers' unwillingness to change. Teachers may face criticism and barriers from colleagues about their implementation of co-construction. Fraser (1999) and Whyte (1999) found secondary colleagues were abrasive to participants involved in PD on integrated curriculum. Also, Hyde (1992a) described reactions from teacher peers which ranged from comments about noise level, lack of control and standards, to student-teacher relationships being too informal. Although presumably, as Cook (1992) claimed, instigating co-construction would be much easier in the supportive environment of a school-wide initiative, the literature provided some instances of teachers attempting it alone (Apple & Beane, 1999; Rabone & Wilson, 1997). This seems surprisingly courageous given the criticisms and constraints.

However, the Freyberg project (Brown & Nolan, 1989; Nolan & McKinnon, 1991; Nolan, Openshaw, McKinnon & Soler, 1992) and the case study research which followed up the MOE Curriculum Integration Professional Development Project in 1998-2001 (Harwood & Nolan, 2002) provided evidence of one longterm example. There had been a sustained tradition since 1986 of integration of social studies, English and some technology for Y10 students in this New Zealand secondary school. Unusually, the integrated studies department had coexisted as a separate culture alongside the other mainstream curriculum

departments which operated in a more traditional manner. The integrated curriculum model involves a willingness by teachers to cross discipline boundaries. The literature provides an example of efforts to implement this in a New Zealand secondary school in the late 1980s (Brown & Nolan, 1989; Nolan et al., 1992). Subsequently, following an upsurge in interest in the approach perhaps related to Beane's (1997) writing, the MOE funded PD contracts in curriculum integration in 1998-2001. The case study report, which uses lengthy teacher questionnaires to obtain data (Harwood & Nolan, 2002), details the growth and development of the approach in schools. However, it is heavily weighted towards the primary sector. Out of the 27 schools that responded only one middle school and one secondary school provided data. (There had been 44 schools in the original PD and although the number of secondary schools involved is not provided, it was clearly small.) There would seem to be a much stronger interest in such approaches in primary sector. Why is this so? Do the disciplines hold sway in secondary to such a degree that curriculum integration is viewed as untenable in that context?

The barriers to change which distinguish the school setting, are augmented by the way the actions of the participants there are prescribed. If teaching and learning is to be dialogic rather than a predominantly one-way process, major transformations are required to traditional teacher and student roles. (*Habitus* and *identity* are other constructs that could be used to effectively conceptualise teacher and student change and resistance.) The application of role theory to teaching has a lengthy history. Calvert (1975) explained the interdependence of the roles of teacher and pupils, which required them to be "constantly engaged in negotiating new variations on classroom interaction themes" (p. 140). This "reciprocity" can be viewed as a dance. If one participant puts in a new move, step or routine, as when a teacher tries to elicit student voice, the other has to find a new way to respond, and may like it or find it disconcerting, uncomfortable or painful. An exploration of ways teacher and student roles are constructed and influenced follows.

Teachers' roles

The identification of teacher roles is a common means of analysing teacher actions. First, traditional and current views that shape teacher roles are discussed, followed by descriptions of the requirements of a co-constructive role. Considerable shifts may be required in teacher behaviour. Second, the findings of research about teachers implementing co-construction are explored.

The role of a teacher is strongly prescribed by the expectations of society and the constraints of the working environment. As pointed out earlier, the traditional "chalk and talk" view of the teacher, often called the transmission model of teaching, has dominated the discourse. This is despite the co-existence for over a century of progressive, child-centred discourses (refer to the section on Dewey earlier in this chapter, and Chapter 1). Boomer (1992c) claimed the support for these discourses in Dewey's era and in the 1990s as 10 percent of the total. Others suggest pedagogical fashion accounts for the waxing and waning of the popularity of co-construction. For example, in the 1970s, extreme forms of child-centred education, termed *laissez faire,* which supposedly gave students many rights, but no responsibilities, received negative publicity which tainted the whole movement (Rudduck & Flutter, 2000). More recently in New Zealand, concern arose about the impact of the 1993 *Curriculum Framework* on what was described as the strongly learner-centred tradition of primary schools (Aikin, 1994; Whyte, 1999). It has been suggested, for example, that an increase in subject specialisation, attributed to the seemingly increased emphasis upon separate learning areas of that framework, may have sidelined curriculum integration in particular (Bishop, 2001).

The wording of documents that stipulate what is required of a New Zealand teacher have considerable influence. Notions such as "delivery", "performance", and "teacher as motivator" can reinforce a transmissive model. Specific examples of this discourse include the Teachers' Council satisfactory teacher dimensions, and the professional standards from the secondary teacher union. The language of these mechanisms of compliance seems to endorse the teacher as expert and transmitter, give the teacher responsibility for student performance, yet

acknowledges the need to use a range of teaching approaches which may require the development of quite different roles. These mixed messages demonstrate a fundamental of so many aspects of teachers' roles which require them holding the tension of opposites (see Palmer's paradoxes, 1998). For example, the satisfactory teacher dimensions of the Teachers' Council (2008), require that the teacher

> … manages student learning processes; manages student behaviour positively; communicates clearly and accurately; uses a range of teaching approaches; engages students in learning; provides feedback to students and assesses learning; demonstrates knowledge of current curricula, and current learning theory; knowledge of appropriate teaching objectives.

And the Post Primary Teachers Association (PPTA) *Professional Standards for Secondary Teachers - Criteria for Quality Teaching* requires that teachers

> … are competent in relevant curricula; … plan and use appropriate teaching programmes, strategies, learning activities and assessments; demonstrate flexibility in a range of effective teaching techniques; make use of appropriate technologies and resources; impart subject content effectively; evaluate and reflect on teaching techniques and strategies with a view to improvement; manage student behaviour effectively; establish constructive relationships with students; … engage students positively in learning…. (PPTA, 2007, pp. 96-97)

These explanations of what is expected of teachers maintain major elements of the traditional role, yet advocate flexibility in teaching approaches which provides opportunity for co-construction. What are the particular roles of a teacher who co-constructs with students? There was a considerable amount of literature devoted to describing and discussing this topic. There was a consensus that some changes and additions to the traditional role were needed, if the goals implied in the quotes are to be realised.

Co-construction requires a reciprocal relationship between teacher and learner. Freire suggested that "teachers must become learners with their students in order to transform learning" (Onore & Lubetsky, 1992, p. 259). However, rather than teachers merely learning about their students' understandings and thus relearning and re-experiencing what they already know, Onore and Lubetsky suggested that

the teacher and student were constructing a new understanding. They argued that a teacher who assumed they knew what needs to be known might find it difficult to listen to their students. They posed a fundamental question: "Until you know the learners, how can you know the essential questions?" (p. 260). The focus on the potential error in teacher presumption that they know what questions will help each child to learn was echoed by Commeyras (1995) in highlighting student questions and their fundamental importance in an inquiry view of learning.

Likewise, Lincoln (1995) stressed that to break students' learnt silence, elicit students' voices and begin the dialogue, teachers must do some fundamental things which may constitute new roles for them. First, they must be "willing to hear and honor those voices", that is, they must be convinced that it is a worthwhile undertaking. Second, they must know how to "elicit student voices," (p. 89), that is, to draw out and negotiate student contributions to curriculum and know how students can help structure their own learning experiences. This can start with simply being able to ask the right questions. However, as well as trying new roles themselves, teachers need to facilitate the development of new student roles. Rabone and Wilson (1997) pointed out the role of the teacher in setting out afresh on this path with students was likely to require significant scaffolding of students because they are unlikely to confidently participate in classroom development processes and decision-making. Rabone's experience in moving to co-construct with her Y10 computer class reinforced that students, like teachers, required time to learn new moves in the classroom. This narrative, though of only one teacher's experience, alerts teachers to potential challenges.

In the literature, roles were commonly used to analyse how teachers would change their classroom practice. To enable co-construction, Cook (1992) explained the teacher's role as moving from dictator to negotiator. The teacher, however, was still in charge. Their responsibilities had not changed, but the methodology for achieving them had. The roles were of "process helper, facilitator, resource linker, and public documenter" (p. 29). He affirmed that the teacher was still a source of ideas, an expert, a provider of information, a guide, a leader who must coordinate operations, clarify, write up programmes, and lead evaluation and reflection.

Boomer (1992a) similarly explained the variety of teacher roles which accompanied the various stages of the negotiation process. He explained that curriculum negotiation requires movement from the "apartness" of traditional classroom encounters where "Teachers teach and children learn…. Teachers decide what is to be done and children usually try to comply", to deliberate "collaboration and a blurring of roles" (p. 32).

Other studies also elaborated roles that are involved for the teacher in co-construction, asserting that some of them may be novel. In describing communities of learners, Brown and Campione (1996) explained the teacher roles as follows: they selected the basic concept for study, provided resource materials (texts, articles, magazines, videos, library access), and guidance. The teacher's role was not a specialist as they often did not know the answer to questions, therefore they had to change the way they interacted with students and provide a useful model of "how to find out". Students are involved in answering their own questions, rather than these being dictated by the teacher. Teaching occurs when required, by either students or the teacher. The presumption of the relative unimportance of teacher content knowledge in this explanation raises a contentious point. It differs from Boomer's view and is in complete contrast to the transmissive model. Furthermore, with today's information and communication technology (ICT) tools students probably have considerably greater access to searching for information themselves. That is, presuming that a classroom has computer facilities available, and students have the skills to evaluate the quality of the information they locate.

How did teachers react to co-constructing with their students? Variation in teacher responses to their experience of co-construction was found in certain studies. An exploration of teachers' roles in collaborative curriculum-making by Zellermayer (1997) revealed a range of constraints and how the process of working collaboratively with students was a varied, personal experience for each teacher (as explained earlier in this chapter). Difficulties with particular aspects of their new roles were evident in a New Zealand study implementing curriculum integration (though predominantly in primary schools) as part of a teacher

development contract in 12 schools. Whyte (1999) identified a distinguishing feature of success was the "level of ability of the teacher to facilitate students taking responsibility for their own learning" (p. 2). A "shared manner" epitomised the approach to the classroom and learning environment of the teacher and children in what were judged exemplary cases (p. 2). There was a struggle for teachers in understanding and implementing this approach which exemplified a fear and anxiety of trying new roles. Numerous aspects highlighted by the teachers' reflection on their practice included: the provisional nature of initial planning by the teacher as the students drive it with their issues, questions and concerns; the need for good questioning skills; risk-taking; learning; practising new behaviours; the relinquishing of the teacher power position; letting go of control of planning/teaching; being flexible, divergent; knowing "where to take a learning situation once it was underway" (p. 8); and being time efficient and energised.

The achievement of these role changes, however, could be easier said than done. Reporting on the same PD contract, Fraser (1999) found mismatches between what teachers claimed they did and what they practised. Though some felt they were negotiating, in that they based units on students' interests, encouraged students to bring relevant resources to school, and gave choices in the order of activities, this seemed superficial when contrasted with examples from Beane (1997) and Boomer et al. (1992). The role of decision-maker was difficult for some teachers to share with students, that is, in planning, organising activities and assessment tasks. When planning units with students, teachers sometimes found that what they thought the children needed was not always required. They needed to have the flexibility to plan with students which put them in roles of co-researcher and co-investigator. However, achieving these dual roles caused anxiety. The importance of teacher knowledge (a contested area - refer to earlier in this section), the ability to shape questions, and teacher modelling were emphasised, as was the willingness to allow students to make mistakes, and take responsibility for mistakes, dead-ends, and revisions.

The above examples suggest that many of the role changes needed to develop co-construction may be problematic for teachers. Further evidence of the difficulty of change from traditional roles to those aligned with constructivist views of teaching and learning was demonstrated by research from teacher education. Mathematics teacher education in Australia has had a constructivist underpinning since 1989. Klein (2001) analysed her own teaching to explain that despite using constructivist practice in her mathematics teacher education course her students did not in the main use constructivist approaches when they went teaching, despite their indicating they would do so. This, she argued, is because of their established understandings of teaching and learning as transmission. Also, she unwittingly maintained the status quo with regard to power, by continuing to model teacher authority and accept student dependence.

Some claim that the extent of uptake of many reforms or innovations in schools is variable and can be thwarted by some teachers who are resistant to change (Helsby, 1999; Woods, Jeffery, Troman, & Boyle, 1997). For example, Rabone acknowledged that only the anxiety of trying to teach a disruptive, unmotivated class caused her to step outside the comfort zone of past practice and try negotiation. It was not a new concept, but one she had seldom utilized over a 20 year teaching career (Rabone & Wilson, 1997). The place of PD in effecting teacher change remains an area of debate.

To enable dialogic classroom relationships would seem to require substantial changes to traditionally conceived teacher roles. The above examples provide evidence that the task is not straightforward, and signal particular areas of challenge. These may, of course, be very context dependent. In co-construction, given the mutuality of teacher and student interaction, the role of students also requires reconsidering. This explanation follows.

Students' roles

The teacher's role is just one part of co-construction: student participation is also crucial. The literature confirms that if students are to co-construct they need to develop certain skills and attitudes. Negotiation requires a learner who is an active

participant, who is prepared to reflect on how they learn, make decisions, accept responsibility and show initiative (Cook, 1992).

There is an implicit assumption made by some researchers and some teachers that students want more active participation and input. There is a vision of students "yearning to have a voice in their own schooling" (Johnston & Nicholls, 1995, p. 94). Some research suggested however, that certain students do not want to be so actively involved (Hyde, 1992a; Johnston & Nicholls, 1995). Using Jones' (1991) New Zealand research with girls of Pacific Island descent as one example, Johnston and Nicholls (1995) explained:

> … many students think school knowledge should not be personally relevant and that teachers should tell them exactly what to learn and how to learn it. They resist teachers who encourage them to take responsibility for the curriculum and to use it to frame their places in the world. (p. 95)

They drew on a range of literature of classroom research which provided examples of students who resisted a co-constructive approach. They explored ways that teachers might deal with some of the difficulties such students can pose. For example, suggestions are given about how to develop a classroom where students listen to each other respectfully and see their peers as resources rather than competitors.

More recent studies have further identified that New Zealand secondary students have a predominantly passive role in the classroom (Bishop et al., 2003; Bishop, Berryman, Cavanagh & Terry, 2007; Bishop, Berryman, Powell & Terry, 2007; Brown, 2002; Mather, 1994; Morris, 1995). Prevailing understandings of learning of students and teachers would seem to support this perception. Morris (1995) used written questionnaires with 467 Y12 and 13 students in a range of 12 New Zealand secondary schools to find their views of factors inside and outside school that promote and inhibit learning. Although a student's motivation was identified as crucial to their success at school, her data did not reveal any desire by students to have greater control of, or involvement in, decisions about their learning. In a small project, Mather (1994) studied learner responsibility and empowerment in Y10 science classrooms through semi-structured interviews with 10 students (6

female, 4 male). She examined whether there was any connection between the level of student empowerment and the likelihood of the learner assuming responsibility for their learning. However, her findings suggest that students did not see any need to be active participants in determining the curriculum. For students as well as most teachers, transmission was what they were accustomed to.

In contrast to their teachers, Brown (2002) discovered from interviews with 108 Y11 students that all except three conceived of learning as mastery of information and facts. However, he argued that students' views reflected what teachers valued in their teaching practices. This "shallow" understanding of learning as remembering, repetition, practice and memorisation aligned with the findings of a Scottish study of 48 junior secondary students which used four focus groups of four students, in each of three schools. They, too, viewed learning as correct performance and providing the right answer (Duffield, Allan, Turner & Morris, 2000). Rosemergy (1997) found the teachers in her study viewed curriculum planning as essentially a teacher activity. Student needs were thought about as one of the internal determinants, but negotiation with students featured only incidentally in their responses.

Likewise, research by Meighan (1986, p. 33) found that students (in the UK) did not want more "participation, autonomy and a democratic set of relationships." Their preference was for a "nice strict" environment in the classroom. This view may have been the result of strong cultural expectations of what schools are supposed to be like and the comfort of familiarity with how schools operate. However, society has changed greatly in the ensuing years, and students' expectations may have also.

Student responses to and perspectives of their role as learners in a co-constructive approach are important. In some instances, however, the teacher gives their readings or recollections of how it seemed to be for students. This was often the case in reports about curriculum negotiation (Boomer et al., 1992). For instance, Hyde (1992a, pp. 53-55) described four varieties of reaction that her students

displayed when she began negotiation in her mathematics class - thankful and amazed, suspicious, dismayed, and contemptuous. These were her perceptions of the student responses, not their own words. However, student response is an important aspect of teacher reflection, despite potential issues of misrepresentation and homogeneity. Fraser (1999) reported that teachers' recollections of their students' responses to curriculum integration often were the evidence they required to motivate them to continue to teach in a co-constructive way.

The importance of consulting students about their experience of learning in schools is emerging as an increasingly important element in improving teaching and learning (Flutter & Rudduck, 2004). Studies have found that students as young as seven years can conceptualise learning (McCallum et al., 2000). Kane and Maw (2005, p. 311) argued that good teaching practice must be informed by "student needs and therefore by consultation with students." This was incorporated as an essential aspect of a New Zealand teacher PD project which aimed to improve student learning. As reported earlier, Y9 and 10 Māori students' experience in New Zealand secondary schools, was the starting point of *Te Kōtahitanga* project (Bishop et al., 2003). However, teachers can be selective in their uptake of student feedback. In a study of six teachers and their Y8 classes at three secondary schools in the UK, McIntyre, Pedder and Rudduck (2005) found teachers' usage of student feedback and ideas, depended on the level of trust and quality of the teacher-student relationship.

Students have been consulted in studies where co-constructive approaches to teaching and learning have been attempted (Hubber, 2005; Loughran & Northfield, 1996; Nicol, Tsai & Gaskell, 2004; Whitehead & Clough, 2004). One study involved a teacher educator in Australia returning to teach lower secondary students (Y7) and having the assistance of a researcher to access student perspectives. From interviews and written responses with 22 students over the period of a year, Loughran and Northfield (1996) found that students appreciated choice and decision-making in assisting their development of understanding and taking responsibility for their own learning. They needed to see the purpose and

value of learning tasks. If teachers were to better interpret student behaviour in their classrooms they needed to be encouraged to listen to students, respond confidently and respect the authority of their experience. However, the demands of class management, the importance to students of their image with peers, and students' prior understandings of teaching and learning were among issues which meant active learning was not achieved to an extent which satisfied the teacher.

Other studies, in various parts of the world, have consulted students to identify their best ways of learning. In the UK, Whitehead and Clough (2004) found in interviews with 139 Y8 students, that listening and discussing were ranked highly, and working in pairs or groups chosen by themselves was preferred to whole class teaching or individual tasks. Discussions and small groups were also favoured by secondary students in an Australian study of a class of 20 (Hubber, 2005). Likewise in Canada, Nicol et al. (2004) interviewed 20 senior secondary students in an applied mathematics class and found engagement was improved in student eyes, where connectedness, collaboration and learner agency was valued.

Other studies have claimed strong student preference for co-construction. In one attempt to identify students' preferred way of learning, Kinchin (2004) used student-designed concept cartoons of "objectivist" (transmissive) and "constructivist" learning as the basis of a written question sheet with 349 UK Y7 and Y9 students. He claimed that the majority of students (88.8%) preferred constructivist methods. However, this study could be viewed as having limitations. Students were given a choice of only two models of teaching. The teaching methods were represented by a cartoon and two dialogue boxes which described in very simple statements the actions of teacher and student. In my view the study was somewhat biased as the constructivist choice was presented in a more student-friendly fashion and thus would be a more attractive option.

A rider to claims about student voice is noteworthy at this point. Johnston and Nicholls (1995), Meighan (1986) and Yair (2000b) brought to attention the way that student voice was often over-generalised and was not necessarily borne out in reality. In addition, it was important to not homogenise student views: those of

girls may be very different from boys; other variations such as culture, social class and geography (rural/urban) may also be salient; and of course there are likely to be varying views within each of these categories, for example, among boys (Meighan, 1986). An important point, reiterated by the same writers, was that schools are also not homogeneous: they vary in the learning opportunities they provide from class to class, from day to day. Likewise, students do not respond in an undifferentiated manner to their schooling: schools, subjects and student mood provided variation. Yair (2000b) asserted growing indications that within-school, between-classroom variations in teaching practices and student achievement are higher than between-school variations; and that student self-concepts are context or subject-matter specific experiences in school. Therefore, it was argued, teachers should try to make instruction more relevant (and thus diverse), providing for much student choice and greater demands on student skills. He suggested reform can take place at the level of the teacher. Evidence from Alton-Lee's (2003) *Quality Teaching for Diverse Students in Schooling: Best Evidence Synthesis Iteration* also puts the emphasis on the teacher. Quality teaching is a key influence for high outcomes for diverse students. Up to 59% of the variance between classes is attributable to the difference between teachers.

This section has identified areas of significant influence which may promote tensions in the development of co-construction in classrooms. The constraints and obstacles are notably robust in secondary schools. Furthermore, there is unanimity in the literature that quite distinctive changes are required to the roles of both teachers and students if co-construction is to proceed. The powerful enculturation of teachers and students in the traditional ways of interacting in classrooms means change is often beset with tensions for both. Students' beliefs about learning are diverse, and this is reflected in the variance in the findings of reviewed studies. Some favoured traditional approaches, whereas elsewhere, social constructivist methods are preferred.

Summary and Issues

The review of the literature has delineated both historical and contemporary explanations of co-construction. Synonymous ideas, illustrated in the

contributions of Dewey, Friere, Vygotsky and Bruner, have coexisted for over a century alongside other representations of classroom learning. In the contemporary field, a diverse array of classroom approaches have developed to operationalise understandings of a transactional collaborative partnership of teacher and learner, and the concomitant ideas of democracy, social justice, and relevance. I began with one of these, curriculum negotiation. Six further models were selected for description. These ranged from Beane's (1997, 2005) integrated curriculum to Bishop et al's (2003) focus on cultural responsiveness. The change of terminology in the thesis was explained. The remainder of the review identified areas of potential tension in co-constructing which related to aspects of school settings and the roles of teacher and students.

The preceding review of relevant literature raised a number of issues about co-construction that suggest avenues for future research. Sociocultural and social constructivist theories of learning are not new. The current New Zealand curriculum and accompanying documents affirm child-centred approaches, curriculum negotiation, and MOE PD contracts suggest support of curriculum integration. *The New Zealand Curriculum* (MOE, 2007b) in particular, endorses pedagogy based on sociocultural understandings. A long tradition of child-centred approaches is claimed for New Zealand primary schools, but what of secondary? What do these ideas mean in secondary contexts? Where is the documentation of attempts to develop such approaches? In junior secondary does the approach improve engagement and alleviate alienation as claimed?

The New Zealand research into co-construction seldom had a secondary school setting. For instance, the greatest set recently emerged from the MOE curriculum integration PD in 1998-2001. It included Whyte (1999), Fraser (1999), Fraser & Whyte (1998a, 1998b, 1998c) as well as Harwood and Nolan (2002). However, these provide data that have a predominantly primary focus, reflective of the weighting of participant schools and teachers. Sewell's (2006) study into the development of a community of learners was also set in a primary school. What accounts for this paucity of information from secondary contexts?

The literature provided examples of a range of methods of investigating co-construction. Common examples included teacher action research on their own teaching (Boomer et al., 1992; Bennett & Ba, 1996; Edwards & Pimpini, 2000); case studies (Harwood & Nolan, 2002; Sewell, 2006; Zellermayer, 1997); use of questionnaires (Harwood & Nolan, 2002), and interviews with teachers (Hargreaves et al., 2001). Interviews or questionnaires with students were also used (Brown, 2002; Cook, 1992; Kinchin, 2005; Mather, 1994; Morris, 1995; Nicol et al., 2004; Whitehead & Clough, 2004; Yair, 2000a, 2000b), though usually as a major focus of a study. They were seldom used routinely to complement the teacher perspective, or as by Kane and Maw (2005), to provide material to be used by teachers. All the above methods had strengths and provided rich data. Nonetheless, their shortcomings were seldom acknowledged. For example, in the case of interviews and questionnaires, issues such as the dependability of memory, and the risk of participants censuring their contributions to what they thought the interviewer wanted, were not declared.

Furthermore, there was a lack of classroom-based research other than teacher reporting of their practice. A classroom observer to provide another perspective to counterbalance, augment and challenge teacher memory was seldom used. There were exceptions (Bishop et al., 2003; Loughran & Northfield, 1996; Page, 1998; Sewell, 2006). However, with the notable exception of Bishop et al. (2003) who were just beginning their PD project to raise the achievement of Māori, no recent literature was found of classroom-based research into this aspect of New Zealand secondary practice. Again, primary classrooms were the setting for the seminal work of Nuthall (1997, 2001, 2002) and Alton-Lee (2006). Methods which include multiple perspectives on classroom attempts to co-construct, such as case studies which included observation, and interviews with students and teachers seem appealing for their immediacy and the multifaceted nature of their data.

The socio-political context strongly influences schools. This produces interesting differences in the development of approaches to teaching and learning. Are there peculiarities in the New Zealand secondary context which facilitate/constrain the practice of co-construction more than in overseas settings? The confusion of

terminology worldwide brings questions about what is in current usage in New Zealand to describe co-construction. Are classes commonly referred to as communities of learners? What do teachers mean when they claim to co-construct?

The importance of teacher content knowledge for co-construction is a contested area in the literature. Further study might illuminate factors that impinge on this variance in viewpoint. How important is content knowledge and pedagogical content knowledge? It would be interesting to know what sorts of practices, strategies and processes are involved in co-construction. Do cooperative groups dominate? Though there is much general explanation of co-construction, there are seldom details of the interactions involved. Of further import is the extent to which teachers have difficulties with the new aspects of their roles.

The New Zealand studies which report on secondary students' learning posits them as having a largely passive role in the classroom. Moreover, many seem to indicate that co-construction is not common. The warnings around role changes are replete. It would be of interest to access students' perspectives on what is happening in the classroom, whether the constraints described are shared and the claims of improved engagement and ownership are justified.

The preceding summary of issues that arise from the review of related literature highlights in particular the paucity of research on co-construction in New Zealand secondary schools. A study which seeks to understand what co-construction means in action in the secondary classroom, for both teachers and students, seems timely. The following chapter introduces the main questions that initiated this study and explains the methodology, methods and data analysis used.

Chapter Three

Methodology and Methods: In Theory and Practice

Introduction

This study aimed to investigate co-construction from the perspectives of secondary school teachers and their students. This chapter outlines the methodological issues that were foundational to the study, and explains the methods used to generate data. First, the research questions are stated and linked to the purposes of the study. Second, the choice of methodology is explained. The research design/process and the methods used are outlined. Finally, the data analysis using coding and memoing is explained.

Research questions

Two major questions were identified to initiate the investigation. These arose from the review of related literature, and the convergence of personal and contextual influences described in Chapter One. It was believed that these questions would permit sufficient flexibility to explore a phenomenon in depth (Strauss & Corbin, 1990). They are:

What do teachers mean, what do they do, and what do they expect, when they co-construct the curriculum with their students?

Few recent studies were located that had sought the views of New Zealand secondary teachers' understandings, expectations and practice of co-construction. Literature about the curriculum integration PD from 1999-2001 provided glimpses of the secondary context, but was predominantly of one school (Brown & Nolan, 1989; Fraser, 1999; Harwood & Nolan, 2002; Whyte, 1999). Indeed, although child-centred approaches to learning have a long tradition in New Zealand primary schools (Aikin, 1994), the situation in secondary classrooms is less well known. Also, assumptions about child-centred approaches should not presume that co-construction is involved. Often the teacher diagnoses student needs, rather than involves the student in negotiation about the classroom curriculum.

Furthermore, secondary education is under-researched in New Zealand. This perception has recently been confirmed in the literature review: *Effective Pedagogy in Mathematics/Pāngarau: Best Evidence Synthesis* (Anthony & Walshaw, 2007). They claim "research has provided only limited information about effective teaching in NZ at secondary school level" (p. 4). Reasons may relate to inherent contextual difficulties in undertaking research.

What do students mean, what do they do, and what do they expect, when they co-construct the curriculum with their teachers?

Most research into co-construction explores the viewpoint of teachers, though notable exceptions include the investigations of Cook (1992), Hyde (1992a) and Sewell (2006). The experiences of secondary students of co-construction, both in their classroom as they were participating, and their views on how it affects them and their learning, had not been extensively researched in New Zealand. Worthy exceptions were Brown and Nolan's (1989) study of curriculum integration at Freyberg High School and *Te Kōtahitanga* (Bishop et al., 2003). Also, as teacher assumptions about their students' reactions may be inaccurate at times, it seemed essential to compare their views with the perspectives of their students on these matters.

3.1 Methodology

The decision about methodology for a study is significant and often difficult. A methodology is "a theory and analysis of how research does or should proceed. [It carries] assumptions or propositions about the nature of knowledge, the self, social interaction, culture and society" (Metz, 2000, p. 61). A qualitative paradigm was deemed to suit the requirements of this study.

A qualitative paradigm stresses the importance of meaning and context. It manifests the complexity and multiple perspectives of people and varying social situations. The often descriptive nature of the resultant research reports are valued for their relevance to practitioners, as they provide windows to aspects of practice that might not otherwise be available (Burns, 2000). Denzin and Lincoln (2003,

pp. 4-5) noted how what is meant by qualitative research changes through time and define qualitative research generically as:

> a situated activity that locates the observer in the world. It consists of a set of interpretive material practices that make the world visible. These practices transform the world. They turn the world into a series of field notes, interviews, conversations, photographs, recordings, and memos to the self. At this level, qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them.

Both quantitative and qualitative approaches yield *empirical* evidence and can be termed *scientific research* (Burns, 2000; Metz, 2000). The distinguishing characteristics are the way the information about the world around us is gathered in a systematic manner and used to support arguments (Metz, 2000).

There need to be compelling reasons besides researcher preference that point definitively to the choice of a qualitative methodology. Three such grounds seemed important. First, the nature of the issue/problem to be researched will make certain ways of proceeding more impelling, substantive, productive and logical (Burgess, 1985; Burns, 2000; Metz, 2000; Meyer, Park, Grenot-Scheyer, Schwartz & Harry, 1998). Second, and following on from this (given the area of interest of this study), the complex nature of educational processes, such as teaching and learning, will influence how understandings about them might be explored (Hitchcock & Hughes, 1995; Wragg, 1999). Third, inquiry into teacher practice and student responses in a natural setting (the school) will bring its own set of requirements (Kemmis & Wilkinson, 1998).

The goals of this particular study into co-construction were subjective: It aimed to source the perceptions, experience and understandings of teachers and students as they co-constructed the curriculum in varied classroom contexts. It was hoped these would provide rich descriptions of the complexity of their realities, and of the possibly diverse methods and reactions involved in these interactions. For these reasons the methodology proposed was interpretive.

A qualitative paradigm was favoured because the nature of the research fell outside the types of preoccupation that suit quantitative methodology. The purposes for investigating co-construction were *not* to isolate causes and effects - as the processes of teaching and learning are far too complex to explain in this linear manner (McGee & Penlington, 2000), to measure and quantify phenomena (e.g., how many teachers co-construct?), to generalise findings (Flick, 2006), or to test a hypothesis. Rather, explanation of the meanings of the experience of co-constructing for the participants was envisaged.

A major aim of a qualitative paradigm is to study people "in their natural settings to see the way in which they attribute meanings in social situations" (Burgess, 1985, p. 8). This study aimed to describe teachers' and students' meanings, what they did in the classroom, what they said, their actions, and their interactions. This required getting into the classroom - fieldwork.

The willingness to "confront and come up against the constraints of the everyday social world" (Denzin & Lincoln, 2003, p. 16) is an acknowledged strength of a qualitative methodology. Qualitative researchers have an interest in context, in the specifics of particular cases: "They see this world in action and embed their findings in it …[they] believe that rich descriptions of the social world are valuable" (Denzin & Lincoln, 2003, p. 16). When researching in the classroom, flexibility is needed, as it is impossible to predict what will happen. This aspect of the qualitative paradigm makes it amenable to the need to adjust and change as the research progresses: "You are not putting together a puzzle, whose pictures you already know. You are constructing a picture which takes shape as you collect and examine the parts" (Bogdan & Biklen, 1982, p. 29).

In this study I wanted to learn from teachers *and students*. Some argue that qualitative inquiry cultivates this capacity to learn from others (Patton, 1990). Generally, how students experience their relations with teachers is seldom asked (Van Manen, 1999) and yet it can be very revealing, as for example, the initial *Te Kōtahitanga* research indicated (Bishop et al., 2003). Students' views, understandings and responses are essential to deepening our understanding of this area.

Grounded Theory

To develop an understanding of co-construction in the context of this study, the intention was to use a "grounded theory" approach to the analysis of the interview, observation and document data (Hitchcock & Hughes, 1995; Strauss & Corbin, 1990). A grounded theory is "one that is inductively derived from the study of the phenomenon it represents…. One begins with an area of study and what is relevant to that area is allowed to emerge" (Strauss & Corbin, 1990, p. 23). This approach to research is in contrast to that of the scientific method where a hypothesis is developed and then data are collected to attempt to test it: "Data are not usually collected to support or to refute hypotheses but categories and concepts are developed during the course of data collection. The theory is therefore not superimposed upon the data but emerges from the data that are collected" (Burgess, 1985, p. 9). As with all research methodologies, there are associated problems when one comes to do this.

The ideas of grounded theory stem from the symbolic interactionist perspective which was founded on the work of G. H. Mead (1967). One of the two variants of symbolic interactionism that developed, namely that of the Chicago school, emphasised a more involved role for the researcher. The aim was to get an "empathetic understanding of the behaviour of the people being studied" (Layder, 1993, p. 38). It required the researcher to try to describe how the world appeared to the participants from their perspective rather than the researcher's own. To achieve this research methods and strategies such as participant observation, interviews and documentary evidence are favoured as they give access to the subjective understandings of the participants.

It was argued by Glaser and Strauss (1967) that theories need to be grounded, to grow directly out of research, fit the real world and be relevant to the people concerned (Layder, 1993). For these reasons they are often seen as particularly suitable for research with children (Greig & Taylor, 1999; Scratchley, 2003). The viewpoints and experiences of students, though receiving more attention recently, are still not included automatically as important to the understanding of a particular issue or process (Flutter & Rudduck, 2004).

The four central criteria of a well-constructed grounded theory are "fit, understanding, generality and control" (Strauss & Corbin, 1990, p. 23). This means that the theory generated is faithful to the data from which it is constructed, to the understandings and experiences of the participants, and should make sense to them. Variations of this method are being used more frequently in New Zealand research in the education field (Fraser, 1998; Robertson, 1995; Rosemergy, 1997; Scratchley, 2003). However, certain metaphors that dominated descriptions of the tenets of grounded theory seemed awkward and at odds with this project. For example, grounded theory "shares the assumption [of qualitative approaches such as ethnography] that the social world must be *discovered* using qualitative methods and employing an *exploratory* orientation" [emphasis added] (Layder, 1993, p. 39). This seemed to suggest a positivist way of viewing the world.

Recent explanations (Charmaz, 2003, 2006; Creswell, 2008) of a constructivist version of grounded theory fitted much more comfortably with both the topic being researched (co-construction), and my own ontological and epistemological views. This version "takes a middle ground between postmodernism and positivism" (Charmaz, 2003, p. 250). Charmaz (2003) criticized earlier proponents of grounded theory such as Glaser and Strauss (1967) and Strauss and Corbin (1990) for the objectivist underpinnings of their positions. To use a method of analysis as Glaser did, which assumes an "objective, external reality, a neutral observer who discovers data, reductionist inquiry of manageable research problems, and objectivist rendering of data" (Charmaz, 2003, p. 250), would transgress most of my beliefs about what the "reality" of this research process encompasses. Though Strauss and Corbin's development of the processes of grounded theory moved further from such a positivist position (Charmaz, 2003, p. 250), their theory still retained strong positivist foundations such as an objective external reality, collection of impartial data and the requirement of verification. The constructivist variety of grounded theory (Charmaz, 2003, 2006; Creswell, 2008), although still open to criticism from postmodern and critical positions, seemed better suited to the requirements of this study.

The use of a grounded theory approach to data analysis permits flexibility in the research process as the preliminaries to the field work, such as the literature review, and the research questions, are seen as starting points, providing direction, but not a confining focus. As the research progresses new questions or emphases may surface as categories in the data and so new literature may need to be read. The process is iterative, as analysis leads to further reading, and perhaps new questions, and is repeated again and again.

The openness of the process permits the acceptance and welcoming of the unexpected in data, rather than the potential hostility to, or underrating of, such material if the goal was to find supportive evidence for a hypothesis. To me it paralleled the organic nature of the learning process, and my reality as a researcher, where I found it necessary to find new literature, (e.g., subject specific literature such as constructivism in mathematics) as the data analysis produced new categories and demanded new questions. Warnings from Glaser of the inappropriateness of "forcing data through preconceived questions, categories, and hypotheses" (Charmaz, 2003, p. 257) served as an ethical counterweight to the strong urges that I felt on occasion as a researcher to follow hunches and to try to make data fit one's own professional experience and knowledge.

Grounded theory provides specific analytic strategies that can be used with data collected by a variety of methods. Constructivist grounded theory views data as reconstructions of experience (Charmaz, 2003), rather than having objective status. Analysis of the data begins early in the data collection. The researcher interprets the data and assigns active codes that may direct future data collection and potentially new directions. Rather than using preconceived codes as a quantitative paradigm would require, the "researcher's interpretations of data shape his or her emergent codes in grounded theory" (p. 258). A major technique of grounded theory is comparison. Producing action codes assists this. The comparisons can be between different people, individuals at different times, different incidents, data within a category, and between different categories (Charmaz, 2003).

A repertoire of possibilities has been developed by various grounded theorists for making connections between codes which include categorizing, dimensionalizing, axial coding and creating a conditional matrix (Glaser & Strauss, 1967; Strauss & Corbin, 1990). Memo writing follows coding, helping bridge the gap with the writing of the final analysis. In this process the researcher elaborates the contents of the action codes, connects categories and helps link the analytic interpretation with details from the data. As the researcher refines categories and develops theoretical constructs, most likely they will note some gaps in the data and holes in theories. At this point what is termed a 'theoretical sampling' may be conducted where specific issues only are sampled. It may mean that settings are returned to or individuals are revisited for further information to assist the fit and relevance of categories. The third phase of this study had this focus. I was wanting to see if the categories developed fitted a new context: co-construction with a new class in a new year.

Saturation is the usual criterion for ending grounded theory research. That is, new data fit into the categories already devised (Charmaz, 2003). More practical requirements however, drove the closure of this field research. These included the negotiated time allocation for the project with the teachers, which had already been extended into a new year to allow further sampling as indicated above; the time restrictions on me as my research was only a part time activity which I fitted around other aspects of my job; the costs of researching in an area at some distance from my home, and the costs of transcribing.

The use of a constructivist grounded theory moves the methods to a position consistent with many of the underpinnings of interpretivists. There can be an emphasis on meaning, the researcher is acknowledged as interactive and therefore contributing to the experience in the data collection, and in the data analysis there are multiple realities.

It would be short sighted not to acknowledge criticisms of grounded theory, as no methodology is foolproof, particularly in implementation. Some researchers have found grounded theory insufficiently respectful of participants and their stories. Fracturing the data by the use of codes and categories when analysing, can be

viewed as interfering with the fulsome expression of the experience of the participants (Charmaz, 2003), which a case study narrative might replicate more accurately. However, in this study the analysis provides a synthesis across participants. Through careful comparison of responses, situations and actions of different people and individuals at different times, the similarities and diversity of experience can be represented. There were too many participants to use a case study approach.

Also, the subjectivity of the analysis must be acknowledged. Because the lens on the data is the researcher, another person might develop different categories. The experience of the researcher can be both an aid and a limitation. The issue of theoretical sensitivity, "the ability to recognise what is important in the data and give it meaning … that is faithful to the reality of the phenomenon under study" (Hitchcock & Hughes, 1995, p. 298), involves the personal and professional experience of the researcher and their knowledge of the literature. Furthermore, it develops during the research process through sceptical interactions with the data which question the accuracy of what is being constructed.

The preceding explanation of the chosen methodology for this study identifies the fit between the area of interest, and the choice of a constructivist grounded theory approach to the analysis of the data. The following section describes the methods used to generate those data.

3.2 Data generation methods

The data generation methods used in this study needed to access the perspectives of co-construction of teachers and students. Further, data about what happens in the classroom, the actions and interactions that constitute the approach were needed. Therefore, as well as multiple perspectives, multiple methods were used in an attempt to secure an in-depth understanding of the phenomenon in question. The methods selected were: classroom observations, interviews with teachers, group interviews with students, and documents. Each method is explained

generically, followed by a specific description of the way it was employed in this study.

3.2.1 Participant observation

Participant observation is a primary technique of interpretive studies. It has a major asset of permitting recording of events as they occur. It utilises the assumption that behaviour is purposeful and illustrative of values and beliefs - the meaning is in the action. This is recognised as probably less censored than "people's retrospective or anticipatory reports of their own behaviour" (Burns, 2000, p. 411). However, for participants to behave as typically as possible with an observer present, issues of cooperation, trust, acceptance, understanding of roles and how the information will be used, need to be addressed with the participants by the researcher (Burns, 2000; Wragg, 1999).

Observers vary in their degree of participation, which can be explained by means of a continuum. At one extreme they are non-participants, concealed behind one-way mirrors. At the other end, they are full participants in the classroom. The gradations in-between vary according to the degree of interaction with the participants (Burns, 2000; Wragg, 1999). The written recording of observations ranges from structured to unstructured. Structured records use prepared grids to carefully note particular behaviours according to a time sequence. In contrast, informal notes of important events being made as they occur characterise an unstructured approach. Often video or audio recordings may be used instead of, or to augment, any written record (Wragg, 1999).

Use of class observation in this study

This study included observation and recording of teacher-student interactions in class by the researcher (Wragg, 1999). I was an observer-as-participant. Usually, I was seated in an unobtrusive place in the classroom taking notes of what ensued. There was minimal interaction with students other than at the start of a lesson when teacher and students acknowledged my presence, and the students to be interviewed that day were named.

The observations in this study were recorded with a semi-structured written record of classroom events by the researcher, and an audiotape. The teacher wore a small audiocassette machine with microphone fitted to a belt around their waist. The researcher's systematic notes of classroom interactions were intended to assist the identification of co-construction. They could be referred to straight after a lesson as a potential source of material for the group interview with students and the reflective interview with the teacher. The notes of the observation could then, if necessary, be checked against teacher and students' recollections. At a distance, they could also be checked against the audiorecording. The schedule devised to make notes of these classroom observations is explained in more detail in the section which follows on documents.

My presence was an intervention. My experiences as a secondary teacher, teacher educator, and understandings of co-construction influenced how I read the interactions of the classroom. In the reflective interviews I was involved in exercising and reconstructing my understandings of co-construction. Therefore, through my interactions with the teachers it was very likely they too would change.

3.2.2 Interviews

The qualitative research interview is seen as a "construction site of knowledge" (Kvale, 1996, p. 42). Using a researcher as traveller metaphor, Kvale describes a journey wandering through the landscape "having conversations with the people encountered", which may be deliberately focused on specific topics. "The journey may not only lead to new knowledge; the traveller may change as well" (1996, p. 4). This view of interview as potentially transformative conversation fits a sociocultural epistemology.

The use of interview is so extensive today, that Fontana and Frey (2003) argue that we live in an interview society. Interviews have become a taken-for-granted activity. However, they should not be regarded as unproblematic representations of life beyond the interchange (Rapley, 2001). Interviews are not neutral tools of data gathering, but active interactions between two (or more) people leading to

negotiated, contextually-based results. Contextual, societal and interpersonal elements cannot be ignored. "Speech-acts are always performative" (Rapley, 2001, p. 307). Each interview context is one of interaction and relation in which both participants present a particular self. This is of the moment and precludes other selves. Although an interview may seem to have the illusion of conversation, a researcher has an institutional agenda to pursue. However, despite "the asymmetry of power" (Kvale, 1996, p. 126), to assume that the interviewer always has the controlling role, can be questioned. As in any relationship, gender, race, SES, and age all affect the interaction and cannot be predicted. The interview process is "persistently slippery, unstable, and ambiguous from person to person, from situation to situation, from time to time" (Scheurich, 1997, p. 76).

For the researcher using interviews there are further issues related to facilitating the interaction. The need to establish rapport and gain trust is viewed as fundamental. Where backgrounds are different, some understanding of the language and culture of the respondents may be helpful. One concern is how to present oneself. This can include matters related to one's job, background, demeanour, and even dress (Burgess, 1985; Cohen & Manion, 1994). However, awareness of these numerous areas of potential difficulty should not demean their richness as a data source.

Rather than a fixed set of questions, many qualitative fieldwork interviews have guides. Such semi-structured interviews have a list of topics or questions that the researcher wants to cover, that will be used flexibly according to the emergent interview situation. This provides greater freedom of response for interviewees, giving greater scope for their interpretations and meanings to surface (Layder, 1993; Tolich & Davidson, 1999). Tolich and Davidson (1999) suggest a three part interview guide made up of introductory questions to put the participant at ease and get them talking, a list of themes which represent the areas of interest of the research, and a set of generic prompts. The outline of topics evolves during the research as knowledge is gained about the research area. Each interview guide builds on those before. It is an "iterative and reflexive process" (Tolich & Davidson, 1999, p. 108).

Use of semi-structured interviews in this study

In this study semi-structured interviews were used for the initial and final interviews and the reflective interviews on the classroom observation with the teacher participants. The reason for having some structure was to ensure coverage of a range of areas judged potentially important to the topic of co-construction. The list of areas gave the researcher some reassurance that the ground would be covered. However, there was also space to probe or follow interests of individual participants as seemed appropriate. Thus, there was a clear direction on the map, but also opportunities to take shortcuts, detours or meander as needed (see Appendix A, initial interview guide; Appendix B, final interview guide). The final interview questions were not formulated until all the observations had been finished. They included many issues that had emerged during the research, which could not have been predicted earlier, as they were not areas which featured in the literature. For example, can students co-construct with students?

The guide to prompt the teacher's reflection after the observed class lesson was followed in a flexible manner depending on the path that the conversation took (see Appendix C, reflective interview guide). Sometimes it seemed irrelevant to pursue particular issues because they did not seem to fit the context of a particular day, or other issues were central to what the teachers wanted to explore. A new guide was formulated for the new year observations with a new class, which focused on issues with working with a new class in a co-constructive manner (see Appendix D, Stage Three reflective interview guide).

Interviewing uses many of the techniques of conversation developed in everyday life. I was aware that when I interview I use paraphrase, immediacy, body language cues, eye contact, and personal experience to develop empathy, and take different roles such as naive inquirer. I use a range of verbal and non-verbal prompts or encouragers. For example: "Can you give me an example? Go on… Really! I don't understand… Could you be more specific? When? How?" I cannot predict what I will do. The judgements are made spontaneously as the interview develops, and are dependent on the infinite possibilities of a particular context.

Active listening skills are essential if the researcher is to follow the meanings of the interviewee and make sensible prompts and subsequent questions. I did not take notes during the audio taped interviews so I could put all my focus into following the conversation and facilitating it. I found that even the occasional check that the red light on the tape recorder was on could interrupt the flow of the interchange. In a school environment you cannot guarantee that you will not be interrupted by others whether students, parents or other members of staff. These can change the direction of an interview.

The length of the interviews varied, with both the initial and final interviews with teachers taking about an hour or more. The teacher reflective interviews, which followed the class observations, ranged in length from five minutes to over half an hour. Many things impinged on this, including whether the teacher was trying to fit it in during morning interval (25 minutes break mid-morning), or lunchtime (3/4 hour break after 1pm). On some days teachers were so busy that there was no time to do the reflection, so it was postponed till my next visit. I was unable to transcribe the tapes immediately after the interviews as suggested as optimal by Tolich and Davidson (1999) because of time constraints. There were instances where the tape did not function perfectly, because of background noise, the distance from the interviewee or the directionality of the microphone.

3.2.3 Group interviews

Group interviews, often named focus groups, rely on questioning several people simultaneously about specific experiences they share. The setting may vary in formality (Fontana & Frey, 2003). They can be "excellent for creating new ideas … to get informants to 'bounce' ideas and experiences off each other." However, they can also be "unwieldy, taking your questions in directions not previously anticipated or intended" (Tolich & Davidson, 1999, p. 122). Such interviews can drift off the topic, as social dynamics and identity within a group may be of greater importance to participants than the focus topic.

Though the skills needed are similar to those for individual interviews, the group format does present some problems not found in individual interviews. Size and

composition of groups, arrangement of seating, eye contact, chairing to keep focus, and clear recording are other issues which demand careful consideration (Fontana & Frey, 2003; Hitchcock & Hughes, 1995). Awareness of the evolving group dynamics is needed by the researcher, along with management skills to prevent domination by particular participants, and encourage participation by all. However, the data generated can be worth the greater difficulty.

Use of student group interviews in this study

A student focus group, which I guided with a set of questions/themes pertinent to the research, was used in this study. (See Appendices E and F for schedules used in Stages One and Three of the study.) A habitual practice evolved. After a reminder at the beginning of a classroom lesson of the purpose of the research, and what this would involve for participants, the identified students on a particular day would take part in their normal class lesson. An effort was made to constitute student groups with gender balance, and diversity in ethnicity and subject ability. The teacher assisted in devising a suitable mix.

A paramount consideration ethically in balancing the desirability of hearing students' viewpoints was the necessity to do as little harm as possible to their classroom learning. For this reason, the group interview sessions with students were all less than 10 minutes. They were scheduled towards the end of the hour-long class. In that time, those involved had to be interrupted from their classwork, and to minimise disruption to the class, move out of the classroom to the adjoining teachers' workroom, and be seated in a circle. These students, who had already given informed consent, would give their perceptions of instances of co-construction during the lesson observed and other related topics. The group interview was recorded on a cassette taperecorder. This would occur each time the class was observed; an estimated three visits per stage. The number of visits and the intervals between them was a matter negotiated with the teacher concerned. It was subject to change dependent on their particular circumstances.

In practice, however, it seemed that the students' experience of talking with me, essentially added benefit to their learning. It provided them with an opportunity to

think about their learning, reflect on their classroom experience and it probably positively impacted. They rarely get a chance to do this.

The implementation of these focus groups had some difficulties. Early into the observations, the number of students was cut from six to four to enable consideration of the questions in greater depth in the time available. (I was lucky enough later in the research to have individual interviews with some older students). To decide when to initiate the student interview, I was looking for a pause in the lesson which lent itself to our moving with as little disruption to others as possible. On at least one occasion, I did not take this initiative as I felt it would be wrong to take the students away from a vibrant learning moment.

Other difficulties which encroached on that focus group time included: on one occasion needing to get written informed consent forms understood and signed, a task usually accomplished beforehand; trying to promote talk on pertinent themes rather than the novelty of students' location in the workroom normally locked and out of bounds to them; making a split second decision about where to locate the group as unexpectedly a teacher might be seated at or near the preferred site, which was a square table with at least six chairs around it.

The patterns that the interviews with a group of students took could be unpredictable. If a particular theme did not set the students talking, other tacks had to be tried. Time pressure was a constant strain, as was the uncertainty of the environment. Trying to find the appropriate wording for a particular group of students was sometimes a struggle, as I tried a range of vocabulary and examples to try to elicit their understandings. For example: "Input? Have a say?" I could not assume that I would develop rapport and gain trust immediately. I was a strange adult in an environment with an established power differential between students and adults. This posed some understandable difficulties for students in relation to confidentiality. Could they answer honestly without fear of censure or retaliation? There were several instances of my being asked, "Who will hear this?" However, in spite of these issues over time, space and trust, students were generally very forthcoming in their reflections on their learning. I was confident they gave me

their viewpoints in a candid manner, sensing from my respectful interactions that this was not a judgmental situation.

3.2.4 Documents

Documentary evidence can help provide context in qualitative projects (Woods, 1983). Several types of documents help the researcher remember the experience of the particular moments, and record detail which would be lost otherwise. Documentary evidence takes many forms: it is produced by the researcher and the researched. For example, researcher produced documents could include notes of observations, transcriptions of tapes of interviews, the researcher's reflections about an observation and understandings of what transpired. Documents sourced from the participants might include handouts a teacher used in a lesson, or material completed by students, such as evaluations of a unit.

L. Richardson (2003, p. 529) uses four categories based on Glaser and Strauss' work, to represent the complexity of the notes that are part of field work: Observation Notes (ON), Methodological Notes (MN), Theoretical Notes (TN), Personal Notes (PN). Explanations of how these notes were utilised in this study follow.

Use of documents in this study

Documents were important data in this study. Richardson's categories were utilised in the following ways. Observation Notes (ON) were concrete details of what I sensed. This category describes the notes that I took as an observer of the class lessons that I attended. The schedule structure evolved to incorporate greater detail as I became more used to the observer role. I devised a simple page format of two columns that had teacher actions and speech on the left, and student actions and speech on the right (see Appendix G for an example). In a narrow central column I noted whether the teacher was interacting with the whole class (W), a group (G) or an individual (I). I recorded the words used in the classroom as accurately as I was able on these pages. Obviously, in most instances, speech is much faster than writing, and as I am not able to use shorthand, there are gaps. However, I tried to keep track of the start of most interactions which I would then

be able to locate on the audiorecording of the teacher's voice during the lesson, should it prove important. Further, at the beginning of the lesson I made a quick diagram of the seating layout of each class, noting where boys, girls, Māori and international students were placed. Any work that the teacher or the students wrote on the whiteboard was noted. I introduced a frame symbol to distinguish this from speech. As this note-taking was refined over time, I introduced numbers to identify each of the seated groups of students, so that by Stage Two, the teacher's movements around the classroom and frequency of interaction with particular groups, could be shown.

Methodological Notes (MN) were messages to myself to assist in the generation of data. They included details such as when to phone; who to talk to; scheduling of observations, reflections and interviews; reminders of what had happened; rescheduling and reminders to act on. These notes began with a list of teacher participants, their contact phone numbers at home and school, and email addresses. To this was added a weekly diagram of each school term, which was overlaid with the six-day timetable, and a list of the "line" of the day that the teachers taught their research class. I put in my times of unavailability such as work related appointments, teaching, meetings, and visits to student teachers in schools. I would plan ahead. Also, major incidents which affected teacher or student availability were noted, such as "away on school camp", "loses Y10 class - need new consent forms", and "prize giving".

Theoretical Notes (TN) were hunches, hypotheses, connections, critiques of what I was doing, thinking, seeing: opening my fieldnotes to alternative interpretations. They provided an element of scepticism, to keep me from being hooked on one way of thinking. These notes became part of what I tried to do between the class observation and the teacher's reflective interview on their lesson. I would go through my observation notes and highlight aspects of interest, perhaps what seemed an example of co-construction, or a different use of language. I would sometimes note on the observation sheet ideas that might describe what I thought was happening. For example, "set up constraint", "explains a constraint", or "students giving feedback". Then I would do my own reflection of what I had seen in the lesson on a separate sheet. This would focus on all manner of things:

what I found challenging, different to my expectations, ideas that surfaced during or after the lesson, reactions of students, possible strategies that the teacher might try, emerging themes and theories, my learnings and suggestions of what might need following up.

Personal Notes (PN) were uncensored feeling statements about the research, the people, my doubts, anxieties, and pleasures. My feelings affect what/how I claim to know. They are a great source for hypotheses: if I am feeling a certain way in a setting, it is possible that others may feel that way too. Because I am quite circumspect, I seldom noted my negative responses. However, I do recollect a few, such as being mildly annoyed when a teacher did not turn up, or had forgotten to ask students for their consents so I was unable to talk to the students at that time. Another instance was a group of students with whom it had been difficult to develop rapport in the short time available. The joys sometimes showed in the laughter recorded on the transcriptions of the reflective interview tapes, or the exclamation marks after a comment like "Students engaged!!!" in the observation notes.

I have added another category which I call Continuity Notes (CN). These were the emails, which were numerous, and the few letters that kept up communication with teacher participants. These might be to remind them about when I would be visiting, to check people's availability, to set up new consents for the new classes in the New Year, to negotiate suitable dates for the workshop, or to send transcripts for checking. These were essential to maintaining the impetus of the research and are different from MN because they were not for my eyes only, they were the written communications between the participants and myself, and were an ideal way of keeping our relationships going over the two years of the research, and subsequently through updates on our lives and the progress of writing up the report.

Documentary data created by the researcher as described above, provides evidence of the partiality of the research experience. It documents my understandings, my constructions, what attracts my attention given the innumerable possibilities in the classroom with its numerous participants. Even

Table 3.1 *Summary of data sources and labelling used in this report*

Method	Code	Description
Participant **classroom observation** (CO)	Jack, CO, 23/10, pp. 1-6	Teacher participant pseudonym, classroom observation notes, observation date, page number/s.
Interviews Interview with teacher participants -Initial interview(II) -Final interview(FI) -Reflective interview on CO Interview with student	 Rae, II, p. 6 Sam, FI, p. 2 Tom, 25/6, p. 5 Mary, 19/3, p. 7	 Participant pseudonym, initial or final interview, transcript page number. Participant pseudonym, observation date, transcript page number. Participant pseudonym, observation date, transcript page number.
Group interviews	Joanss, 11/11, p. 1	Students of teacher participant pseudonym, interview date, transcript page number.
Documents Observation notes (ON)	See labelling of classroom observations (CO) above	
Methodological notes (MN) - my diagrams, lists and information to assist visits to study site		
Theoretical notes (TN) –my notes or comments about observation Personal notes (PN) Continuity notes (CN)- emails, letters to and from participants	Tom, 16/3 memo Roy, 11/12/06 email Rae, 23/5/04 letter	Teacher participant pseudonym, observation date. Teacher participant pseudonym, email date. Teacher participant pseudonym, letter date.

though I had decided to focus on particular aspects of the environment and participants, for example, seating pattern, verbal interactions of teacher and students/student, positioning of teacher in the classroom, I may not be able to record all this evidence adequately, or accurately given my distance from/ proximity to the action.

A description of the data generation methods used in this study and a general consideration of issues related to their use was provided in this section. Each was followed by explanations of the particular way these data sources were utilised in the context of this study. (A summary of these data sources and the labelling used in this report is found in Table 3.1.) The detail of the context, the design of the study and the specifics of the analysis of data follow.

3.3 The context and data analysis

3.3.1 Entry into the field: Finding participants

My initial efforts to find teachers interested in participating in a study on co-construction were unsuccessful. While one principal showed some interest, this did not lead to anything. Eventually, entry to an interested secondary school emerged via my association with Professor Russell Bishop. His project, *Te Kōtahitanga*, was already operating in a number of schools. I was invited to a planning meeting, in February 2003, with school and university staff for an April *hui* (meeting) for new and already participating teachers in the project. It was suggested that the "Stage 2" programme for previous year's participants include sessions on co-construction, integrated curriculum and cooperative learning strategies. I was asked to organise the one on co-construction.

I visited one of the participating schools in late February to become familiar with the research project in action. In these two invaluable days I got to know the researchers, learnt how to use the observation tool (see Appendix H) to analyse teacher classroom interactions by working alongside them, and was involved as a participant in the workshops held for teachers on the tool and planning the hui. In this period of *whanaungatanga* (establishing relationships/getting to know

people), I was able to meet new teacher participants as well as observe some Stage 2 participants teaching. In preparation for the hui session I asked staff to send me ideas for the focus of the co-construction session. In other words, what was their prior knowledge? What were their questions, issues, and concerns? I found myself somewhat embarrassed to be typecast as expert. I wanted to use a co-constructive approach, therefore I needed to have input from staff about their needs. This dialogue would help our focus at the hui to be beneficial to as many as possible. The involvement in the *Te Kōtahitanga* project required a terminology change from curriculum negotiation to co-construction. This seemed quite easy as the meanings seemed identical. The definition in the literature that accompanied the tool seemed very cogent, meaning essentially the same as curriculum negotiation [2] (see Appendix H).

Ahead of the workshop on co-construction, I asked permission of the principal of the participating secondary school to invite anyone interested in working further in the area of co-construction to contact me afterwards. I explained what the research would involve and provided information sheets to be left in the staffroom (Appendix I). The school was a coeducational decile[3] 6, years 9-13 school, situated in a provincial city, with a roll of over 700 and more than 50 teachers. Among students, gender balance was equal and ethnicity was 51% *Pākehā* (New Zealanders of European ancestry), 37% Māori, 10% Asian, and 2% other ethnic groups. The surrounding area is steeped in a rich Māori heritage which was reflected in school life (Education Review Office, 2003).

On the evening prior to the workshop on co-construction, participants (around 25) answered a short questionnaire about their prior knowledge of co-construction. In

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[2] The definition of co-construction was "co-construct the learning process, style, content with students" or "to work as a learner with co-learners, to negotiate learning contexts and content" (Bishop et al., 2003, pp. 126 -127).

[3] A school's decile indicates the extent to which it draws its students from low socio-economic communities. Decile 1 are the 10% of schools with the highest proportion, Decile 10 schools are the 10% of schools with the lowest proportion of these students.

addition, they suggested areas of interest to enable me to finetune my planning. All these Stage 2 people had some knowledge of co-construction from *Te Kōtahitanga* project. The three-hour workshop began with an activity that explored teachers' beliefs about student and teacher roles and any requisite adjustment to these if they were to implement a co-constructive approach in their classrooms. This was followed by a further clarification of co-construction and discussion of issues, such as the benefits of co-construction, and explanation of synonymous educational terminology, for example, *co-create* (Lauritzen & Jaeger, 1997), and curriculum negotiation (Boomer et al., 1992). In addition, participants generated examples of potential opportunities for co-construction in the classroom and roleplayed these in the sharing. Because the session was shortened by unexpected events on the marae, other aspects were left out - such as viewing examples of curriculum integration from a Beane video, and getting teachers to identify their own next steps in the development of their practice. However some relevant literature, such as the article *Curriculum Integration as Treaty Praxis* (Fraser & Paraha, 2002), was dispersed.

After the *hui* workshop several teachers approached me indicating their potential interest, and one Head of Department (HOD) hoped to involve their whole department. From this initial dialogue I arranged to address the mathematics department at the school in early May to discuss what the research might involve and to meet again with the principal to provide more detailed coverage of what was envisaged. This led to an invitation to attend a board of trustees' meeting in June to explain the research project, its interface with *Te Kōtahitanga* and answer any questions that arose.

A couple of other teachers showed initial interest in the project but eventually declined to participate: one because he had been appointed to a position of responsibility and felt that extra workload would preclude adequate participation; and the second was a beginning teacher who decided to withdraw because he had not used co-construction, despite my reassurances that this was not problematic.

The research project began with six mathematics teachers (two in the department did not wish to take part, feeling their need was resources rather than observation

of their current practice) and one art teacher. Table 3.2 summarises details about the teachers, such as their qualifications and length of service. Once teachers had committed to the project and I had the approval and support of the principal and board of trustees, I arranged to visit the classes the teachers had selected to work with on the project to explain to the students what would be happening and to distribute information sheets and consent forms for their parents/caregivers (see Appendix J). Students were mainly Y9 or 10, but there were three classes of Y13. (Although the research had originally been conceptualised as focused on junior classes, not all the teacher participants taught these classes.) Once these forms had been returned, those students permitted to participate by their parents/caregivers were asked for their informed consent. In total 292 students were observed in classes (66 were in Y13). Of these, 89 were involved in group interviews. I also had individual interviews with five senior students.

Setting issues

The sole secondary school setting had numerous advantages for the researcher. These included: a single site to visit, even though at a considerable distance from my home; the concentration of most participants in a single department mainly teaching in the same block of classrooms; a suite of interconnecting rooms between the classrooms (the teachers' work room and resource storage) which provided an onsite location and potential place to interview the students; the same workroom provided a point of contact where usually I could locate at least one of the participants by phone or in person; the ease of passing on messages between participants given their proximity; the richer exploration possible with a narrow context than if the participants had been drawn from different subject areas at the same site or across different sites; and possibly a greater chance of being accepted and participants feeling at ease with me, because I visited much more frequently than if I had been seeing isolated teachers at a range of sites, or even in different departments at the same site.

There were some drawbacks for the researcher which epitomise some of the difficulties of researching in a secondary school context. There were some intrusions to the planned observations such as unexpected assemblies, fire alarms, staff being held up by other responsibilities or away on school camps, or a student

teacher needing to teach the class rather than the participant. All required flexibility in the researcher. Also the confinement to one site and predominantly one subject area may have precluded a range of issues or ideas related to context to emerge.

Table 3.2 *Summary of teachers and their details*

Pseudonym	*Gender and ethnicity*	*Subject areas*	*Years of service*	*Fulltime (FT)/ Parttime (PT)*	*Qualifications*
Joan *	Female European	Mathematics	11	PT	BA (mathematics) Dip Tchg
Joy 3	Female Pākehā	Mathematics	15	PT	BSc (biology), Dip Tchg
Jack	Male NZ European	Mathematics	29	FT	BSc (mathematics) Dip Tchg
Kate #	Female Pākehā	Mathematics		PT	BHort Science
Rae 3	Female Māori	Mathematics	5	PT	BMSMajor, accounting, management studies. Dip Tchg
Roy *	Male Pākehā	Art Art history	25+	FT	MFA*Whitcliffe* BEd (primary)
Sam 3	Male NZ European	Mathematics	7	FT	BEng*(Cant),* Dip Tchg
Tom 3	Male European	Mathematics	25	FT	TTC

**Withdrew at end of Stage 1 # Began at beginning of Stage 2 3 Involved in Stage 3 observations*

For the teacher participants there were advantages having most members of a department involved, including the greater possibility of teachers sharing ideas and developing resources for particular curriculum content as they saw each other daily and were often teaching the same topics to their junior classes; on-going support for each other; a shared sense of purpose and focus; and, constructive critique.

3.3.2 Study design

Table 3.3 provides an overview of the stages of the study. The data generation began with an initial individual semi-structured interview with the teacher participants which asked selected biographical details, as well as information about their teaching career, and understandings and usage of co-construction over time and in different contexts (see Appendix A). Next, we refined the intended research procedures. This initial period, called Stage One, got the research underway. This involved coordinating the consent process with teachers, students and their parents, beginning classroom observations, student focus groups and teacher reflective interviews.

Two classroom observations were negotiated with each of the teacher participants in June/July 2003, during which we trialled the observations, and finetuned procedures and recording methods (both the taperecorder, and the notes that I took during the class). As soon as was convenient after the lesson, the teacher had a reflective interview covering a range of areas, such as their identification of co-construction in their lesson and their responses to its use. If appropriate, feedback on the lesson from the student focus group was contributed by me to this reflection to enhance or sometimes challenge the teacher's viewpoints.

After this preliminary set of observations, a meeting with the whole mathematics department was held before the end of the second term, to share views about co-construction. The agenda explored structures for supporting the participants to sustain their practice, identified department and individual goals, generated possible strategies for co-construction across particular aspects of the classroom

curriculum (see Appendix M), and documented indicators of progress in co-construction in the classroom.

Subsequently, a further series of classroom observations was scheduled later in the year at times suitable to both participants and myself (Stage Two). I was restricted in the days I was able to get to the site by my job commitments. Likewise, teacher participants had all manner of responsibilities and constraints relating to the school's programme to be negotiated. These included exams, school camps, *kapa haka* competitions, Stage Challenge, report writing, coaching engagements, trips related to sports, and family commitments. However, the schedule achieved proved adequate to provide invaluable data of co-construction in action as well as support for the teachers to continue their efforts.

A decision was made to return for a third series of observations at the beginning of 2004 (Stage Three) because issues which arose during the study suggested the need for theoretical sampling. Some participants had developed a strongly co-constructive approach with their observed class, and issues about how to establish the approach with another class became apparent. Furthermore, interest was heightened by the attribution by some teachers of the success of the approach to their luck in having a particularly receptive class. Accordingly, we were beginning to wonder what it would be like to start co-construction with a new class; whether new issues would ensue, new qualities of experience would occur, and whether there would be difference in the meanings, actions, and expectations of teachers and students. Four teachers were able to continue in this next phase, all with Y9 or 10 classes.

As envisaged in the proposal, a daylong workshop was held to share our experiences and understandings at the end of the observations. (Teachers had already had a final individual interview.) Chances for further development were provided by articles on co-construction, and samplings of extracts from articles or books on co-construction in mathematics that teachers could request if they were interested. A session about co-constructive practices in mathematics by a lecturer colleague ended the day. This day provided a reasonably clear closure to the in-school participation of the teachers. They had subsequent communication with me

as we continued the process of editing and checking the transcripts from their final interviews and last few reflections.

Table 3.3 *Diagram of research stages*

Date	Name	Events
2002	**Induction**	Visit *Te Kōtahitanga* research sites. *Whaunaungatanga*.
2003 April May	**Preparatory**	Workshop at *hui* and invitation to participate. Meeting with mathematics department, principal, and board of trustees.
June July	**Stage One**	Initial interviews with seven teachers. Consent process. Two classroom observations with each teacher (7), followed by group interviews with six students from each class and reflective interview with teacher. Department meeting.
August September October November	**Stage Two**	Another series of up to five classroom observations with each teacher (6), group interviews with four students following each class, and reflective interview with teacher.
2004 February March April	**Stage Three**	New student consent round. Two classroom observations with four teachers with new junior classes. Group interviews with four students following each class and reflective interview with teacher. Individual interviews with five senior students. Final interview with six teachers.
May	**Exit from site**	Professional development day for department

Ethical Considerations

Ethical consent to undertake the study was necessary as it involved generating data with human participants (University of Waikato, 2002). General principles were followed which included identifying clear objectives for and justification of

the study, procedures for informing and inviting participants to take part, and obtaining informed consent. The involvement anticipated for teacher and student participants, and methods of data handling and storage were clearly explained. The consideration of potential harm to participants and how these would be avoided or minimised was pursued in relation to all anticipated aspects of the study. These included access to participants, voluntary participation, informed consent, confidentiality, protection of student learning, use of pseudonyms, right to decline, review and use of information, copyright and ownership of data.

In a classroom, a teacher participant who has given informed consent may be in interactions with up to 30 students; students' informed consent is therefore an essential prerequisite to the research because students would be observed and their interactions noted. Because the students were of school age, their parents/caregivers had to first agree to their child's participation. Then the students had the opportunity to consent themselves. This clarified whether they were willing to participate in focus group interviews.

Ethical considerations are a continuing part of a study. Some issues can be predicted and thought through before one embarks, while others arise out of the complexity and unpredictability of life and the particular setting of the school. For example, what should the researcher do when an outsider teacher comes into the interview space, eavesdrops on students' contributions during their time there and makes disparaging comments? In another situation, I made the decision not to have an interview with students because I felt it would be wrong to interrupt their learning at that particular point in time. This exemplified how ethical considerations are part of every moment of a research project and that not all situations can be predicted or solved in a win-win way (for the research to win as well I would have wanted an interview).

3.3.3 Data analysis: Using grounded theory

Grounded theory principles were utilised in this study. However, strict adherence to all the suggested procedures was not possible or time efficient. Grounded theory's intent is to explain a phenomenon or process (Creswell, 2008). Indeed,

Charmaz (2006, p. 178) claims that rather than viewing grounded theory "as an application of procedures" it can be viewed as the product of "emergent processes that occur through interaction". The main precept of analysing data from the bottom up is important in that coding starts with the empirical evidence, rather than being imposed to fit preconceived ideas.

Coding and memoing

Coding means "naming segments of data with a label that simultaneously categorizes, summarizes and accounts for each piece of data" (Charmaz, 2006, p. 43). It is the first step in making an analytic interpretation of the data:

> Our codes show how we select, separate, and sort data to begin an analytic accounting of them. Qualitative codes take segments of data apart, name them in concise terms, and propose an analytic handle to develop abstract ideas for interpreting each segment of data. As we code we ask: which theoretical categories might these statements indicate? (p. 45)

Codes stick closely to the data and try to portray meanings and actions which generate the "bones" of the analysis. Integration of these bones begins the development of a skeletal theory (Charmaz, 2006). Whether coding is line-by-line or by comparing incident to incident depends on the type of data. Whatever unit of data is coded, comparative methods are used to establish distinctions. What is seen in data depends in part upon the researcher's prior perspectives, which should be seen as only one possible view among many. This helps develop greater "awareness of the concepts that you employ and might impose on your data" (p. 54). Active language is recommended for coding. *In vivo* is the term given to codes that use participants' terms to capture meaning. For example in this study *spoonfeeding* was a term used by some teacher and student participants to denote transmission style of teaching in comparison to co-construction. This was utilised as an *in vivo* code.

Two main phases of coding can usually be identified. Initial or open coding begins the coding process by naming chosen segments of data. This is followed by selective or focused coding, which takes the most significant or frequent initial codes and uses them to "sort, synthesize, integrate and organise large amounts of

data" (Charmaz, 2006, p. 46). A third type of coding termed "axial coding" can be used to establish the relationships between categories and subcategories. It can identify the properties and dimensions of a category. It is a means of reassembling the data after coding to provide coherence to the emerging analysis. Such coding answers the questions "when, where, why, who, how, and with what consequences" (Strauss & Corbin, 1998, p. 125). The usage of such coding by researchers can vary from a formal application of a suggested organisational structure, for example covering conditions, actions/interactions, and consequences (Strauss & Corbin, 1998), to the use of diagrams to elaborate categories and make links between them (Charmaz, 2006). Its usage is debated (see Charmaz, 2006, p. 62ff).

Memos are informal analytic notes that record thoughts, comparisons and connections as the research proceeds. They can help you develop your ideas, and also pose questions and directions to follow. They provide an intermediate step between data collection and writing drafts of papers. It is suggested that such a process begin early in the research process and continue as it "keeps you involved in the analysis and helps you to increase the level of abstraction of your ideas" (Charmaz, 2006, p. 72). (See 3.2.4. Documents.)

Rather than provide a full narrative, "grounded theorists look for patterns" and "typically invoke respondents' stories to illustrate points" (Charmaz, 2006, p. 82). Bringing ample raw data into a memo provides evidence for analytic ideas, grounds the analysis and "lays a foundation for making claims about it. Including verbatim material from different sources permits you to make precise comparisons right in the memo" (p. 82) which enable patterns to be defined which can move your work beyond the individual case. Memos should be viewed as "partial, preliminary and provisional" (Charmaz, 2006, p. 84), and can help clarify major and minor categories and relationships. What Charmaz (2006, p. 86) terms "clustering" is a diagrammatic way of representing how the codes fit together and relate to categories, which is another way of approaching writing. The terms *mindmapping* or *concept mapping* represent similar ideas.

Coding and memoing in this study

The initial research questions provided some starting points. However, they did not obscure themes that emerged in the data. An attempt to use a computer based coding system, software package NUD*IST, was aborted because of difficulties due to the incompatibility of the computer I had and the software. Therefore, as coding was to be manual, the transcripts were formatted into a working form that had the text on the lefthand half of the page, providing a broad working column on the right to code the content.

Coding

I began the line-by-line coding of the initial interviews with teachers by writing codes to represent the meanings of the text, in the right hand working column. Often this took the form suggested by Charmaz (2006, p. 49) of gerunds (words formed from verbs which end in –ing, e.g., talking, which function as nouns), which provide "a strong sense of action and sequence". However, elsewhere, summarising statements were used. Simultaneously, while generating such coding, or soon after, I used three colour codes to highlight the text sections related to the research questions**: What do teachers mean, what do they do, and what do they expect, when they co-construct the curriculum with their students?** These highlighted lines or sometimes portions of text. Sometimes the same line or portion related to more than one category. To these were added colours to represent other categories that featured a lot. This process was not linear: I was moving unpredictably from codes to categories to subcategories in no particular order in the process of engaging deeply with the meanings in the transcripts. Then through continuing comparison mind maps were made which represented the codes and built subcategories within these major categories. (Appendix K provides an example of coding and categorising.)

The students' transcripts from the Stage One were similarly coded line by line or in segments of meaning and then colour coded into categories that related to the original research question: **What do students mean, what do they do, and what do they expect, when they co-construct the curriculum with their teachers?** The interpretation of "mean" overwhelmingly tended to be explained as examples

of what doing co-construction or having input into their class consisted of in practice. Other categories were again required to cover other significant ideas frequently appearing in the coding. A summary sheet of each transcript identified the codes represented in it. Then the varying codes and subcategories within the major categories were represented on a mind map, which identified the specific occurrences in the transcript. For example, among the numerous examples students gave of what doing co-construction might entail, there is a cluster "students asking questions" identified Raess, 19/6, p. 1; this is linked to another code "doing assignment on own question", Joyss, 30/6, p. 1; Joanss, 18/6, p. 6; to which is linked "suggesting what can do" Tomss, 25/6, p. 2; Raess, 27/6, p. 3.

Following this initial coding, the other documents from Stage One (the transcripts from teachers' reflective interviews, the observation notes, and my memos and notes following these) were also carefully colour coded, and categorised. Then from student data, teacher data and observations, the major themes (categories) which had emerged in this first part of the research were diagrammed. Themes covered the areas posed in the initial research questions, but other major topics included differing usage across subject areas (an issue which emerged strongly in students' interviews) and all the constraints to utilising the approach. This diagram with its five major categories was used as the starting point of the writing up of the findings.

Focus coding followed this initial analysis. Each of the five themes was carefully coded through Stages Two and Three and the final teacher interviews, to see if new subcategories arose. New examples were provided or changes were identifiable in the meanings or processes. An example of this was charting how teachers' understandings of co-construction evolved over the time of the study, from their initial positions to their own models which were detailed in the final interviews and workshop. Because of the dynamic nature of these understandings, it became clear that the way the original question framed "meaning" needed reinterpretation from a seemingly static entity into explanations which attempted to represent the indecision, inadequacy, complexity and changes in these understandings which the study revealed as it progressed.

Memo writing

Memo writing was used during the research process (see 3.2.4. Documents-theoretical notes, TN), especially after classroom observations, as I tried to interrogate my interpretations of these and note aspects of a lesson that might be construed as co-construction. I was analysing the lessons for themes, ideas and similarities before and during the reflections with teachers and the group interviews with students. Also, I would use ideas from one participant to frame questions or angles on topics for other participants. I noted my struggles to understand co-construction in light of my previous understandings from practice and literature and the ways it was being represented by these students and teachers in these classrooms. Sometimes diagrams and words were used to help represent my thinking and queries. Memoing was also a facet of the writing up of the report overall. Sections of categories were written, crafted and changed in the iterative process of making comparisons across time, personnel and classes.

3.3.4 Data presentation: Reporting the findings

Five major themes emerged from the first phase of the study and were sufficiently broad to subsume all other subcategories that arose. These were used to organise the writing of the sections of this report. Chapter 4 focuses on the practices, what students and teachers do when they co-construct, a major focus of the initial study questions. Chapter 5 covers the themes of what impeded and assisted co-construction: the suitability of subjects, evolving understandings, constraints, and reasons to persevere. These complete the original foci on meaning and expectations of co-construction by students and teachers, but also encompass the emergent categories of what enables and constrains the approach, including with new classes, as Stage Three set out to explore.

3.3.5 The trustworthiness of a study

The evaluation of the quality of an interpretive study is an important area. As an alternative to validation, to establish trustworthiness most qualitative research uses triangulation: "The combination of multiple methodological practices, empirical materials, perspectives, and observers in a single study is best

understood … as a strategy that adds rigor, breadth, complexity, richness, and depth to any inquiry" (Denzin & Lincoln, 2003, p. 8).

According to Burns (2000), in educational research there is justification for the use of at least three different viewpoints in analysis. Each point of the triangle stands in a unique position with respect to access to relevant data about a teaching situation. The teacher, students and participant-observer can be perceived as providing different perspectives about aspects of classroom experience. However, Bogdan and Biklen (1998) argue that a researcher should avoid using the term, triangulation, because of its numerous connotations, and instead describe what was done. As an alternative Richardson (1997) proposed crystallization, which provides an image of the complexity and multifaceted nature of the realities that a study might attempt to represent.

However, the role of the researcher in a solitary study is perhaps encapsulated accurately by Patton's (1990) observation: "In qualitative inquiry *the researcher is the instrument*. Validity in qualitative methods, therefore, hinges to a great extent on the skill, competence, and rigor of the person doing the fieldwork" (p. 14). Being aware of oneself as the conduit in a study helps foreground the partiality of a work. It also heightens the vigilance to accurately represent the perspectives of participants, through consciously questioning one's own interpretations of these, and reflecting on the disparities between our perspectives, which may require change. Also, it enhances the need to strive for precision and competency throughout the process. Other ways of addressing these areas include asking participants to check the emerging themes and conclusions in a study, or to participate in developing the conclusions of a study. Also, the researcher can keep reflective journals or memos of their thinking about the data as it is generated and analysed. The idea of leaving an audit trail of the whole research process, that is keeping a very comprehensive record of all that the study involved as it proceeds, is another useful tool (Willis, Jost & Nilakanta, 2007).

The trustworthiness of this study

This study carefully utilised several procedures to ensure that the contribution it makes to the understanding of co-construction is creditable. These measures incorporate the methodology, methods of data generation, ethical treatment of participants, the methods of analysis, and presentation of the findings. To assist in providing a thorough understanding of co-construction this study used multiple methods, and accessed different perspectives over a period of time. A variety of methods was used to provide rich data, capture the complexity of co-construction, and represent the varied realities of participants. Data were generated about co-construction by interviews with both teachers and students, and researcher observations of the classroom interactions which were supported by audiotape recordings and documentation. Also, the perspectives of different participants, teachers, students and myself, about the same classroom lessons were represented. In addition, classroom observations were in three sets, spread over the duration of a year, with the final set with a new class in the new school year.

The positioning of the researcher has been important throughout this study. Grounded theory works best when the researcher collects the data as well as does the analysis because "you can explore nuances of meaning and process" (Charmaz, 2006, p. 34). The researcher becomes saturated in the data, processing them through thinking and writing throughout the time of the project. I had "interpretive authority over the data" (Kidder & Fine, 1997, p. 48). This study generated rich and copious data. I checked the transcripts, wrote the codes, grouped the subcategories, trying at all times to be honest in my representation of the data. Charmaz (2006) argues that the quality of a study starts with the quality of the data. I wrote the memos and kept documentation to help me remember the journey. I struggled to make meaning, and strove to make some cohesive sense of the whole experience. I was the only person who was present in all the settings, the conduit of all the interviews and observations.

My desire to behave ethically pervaded the study. I tried to develop "a cooperative, shared, reciprocal rather than hierarchical relationship with the participants" (Hitchcock & Hughes, 1995, p. 71). Where possible I tried to "co-

construct" the research design with the participants, paralleling the process being researched. I was aware that the voices of the teachers and students were affected by the context in which we were relating. An analysis of these factors is to acknowledge that their voices (and mine) were shaped by the ecology of this place, time and group both specifically, and broadly in considering this society and time in history.

Summary

This chapter has described and summarised the theoretical foundations of the qualitative methodology and methods of data generation of this study. The methodology in action is detailed in subsequent sections. The specifics of the study, which included the findings of participants, research design, ethical considerations, and data analysis using a grounded theory approach, precede the consideration of the credibility of the overall project.

The following chapter begins the reporting of the findings of the study with an explanation of the practices, what students and teachers do when they co-construct, a major focus of the initial study questions.

Chapter Four

Findings and Discussion: The Practices

Introduction.

The following two chapters report the findings from the study into co-construction. The topics in these chapters closely follow those identified in the original research questions, which sought information from the perspectives of teachers and students about what they mean, do, and expect, when they are co-constructing. Three themes follow these directions: evolving understandings, the practices, and reasons to persist with co-construction. Two other main themes emerged from the findings - the suitability of subject areas and the constraints that impeded co-construction. These were major concerns that arose from the focus on implementation into practice.

The explanation of each theme is followed by a discussion section. The findings are described using material from the documented class observations, the transcripts of interviews and meetings with teachers, and interviews with students. Extracts from these sources are used to illustrate common and distinctive viewpoints. The data and their sources are labelled according to the codes explained in Table 3.1, Chapter 3, page 79. The use of multiple listings does indicate some level of frequency of occurrence, but should in no way be seen as exhaustive. Sometimes, a verbatim statement by one participant is cited. This is followed, on occasion, by participants in parentheses whose statements concurred. Overlap between themes is inevitable when trying to portray and deconstruct the complexity of teaching and learning from varied perspectives. However, where possible I have tried to minimise repetition by cross-referencing to explanations of similar ideas within and between the chapters.

This chapter describes the first theme - the practices that characterised co-construction for teachers and students in this study. The following chapter covers

the themes of what impeded and assisted co-construction: the suitability of subjects, evolving understandings, constraints, and reasons to persevere.

4.1 Findings: The Practices

Identifying co-constructive practices was an important theme in the study for both teachers and students. The identification of examples of co-construction (or using the discourse of the students: when they had opportunities to have "input" or "a say" in their classroom curriculum) dominated a good proportion of all the interviews, the two meetings with teachers, and the interviews with students that followed classroom observations. For teachers, examining how co-construction might be implemented was of import to their pedagogical learning. Thus, this chapter outlines the findings related to the research questions "What do students and teachers do when they co-construct?"

The literature generally concurs that co-constructive practices take various forms from planning programmes and units with students, accessing students' prior learning to scaffold new learning, using contexts which relate to students' lives, strategies such as cooperative groups and jigsaw through to involving students in assessment and evaluation of their learning and the process (Beane, 1997; Bishop, 2003; Boomer et al., 1992; Lauritzen & Jaegar, 1997). However, it is important to stress that no teaching approach has the exclusive preserve of particular interactions or strategies. Rather, though an approach may accentuate particular interactions and strategies, of greater significance are the foundational motives and beliefs. Teachers identified certain practices as co-construction in their interviews and reflections on their lessons. All the teachers regularly used some of these practices, others were only used occasionally or in particular circumstances or by some of the teachers; and yet other practices were not viewed with any unanimity as part of the co-construction repertoire. The teachers' explanations in interviews of their previous practices and their conjectures about future uses of co-construction, helped provide some continuity and overview of their practice that the observations alone could not reveal because of their limited number and spacing over time.

In many instances students were able to corroborate that such practices provided them with opportunities to participate actively and contribute to the classroom curriculum. It is important however, to heed the proviso provided by a student when trying to recall his classroom experiences: "We don't realise what we are putting in, we just *do* it" (Tomss, 19/6, p. 2). This was also the case with teachers who were often unconscious of aspects of their practice that had been rendered invisible by their habitual nature (Sam, 27/6, p. 10). And to heed that participation is not always observable action, it can be thinking: "In my head" (Samss, 27/6, p. 1).

The coverage of this theme is divided into two main sections following the classification used in Bishop et al.'s (2003) definition (see Chapter 3): first, the co-constructive practices related to content: that is, "what they learn"; and second, the co-constructive practices related to process: that is, "how they learn".

4.1.1 Co-construction of content: "What students learn"

The findings about co-construction of content are formatted broadly into three groupings: practices that occur *before* learning (planning of programmes and units), *during* learning, and *after* learning (summative assessment, evaluation, and reporting to parents/caregivers). This categorisation is not definitive but aims to give some coherence to the complexity in sequencing classroom teaching and learning from the teacher's perspective.

4.1.1.1 Before learning

This section focuses on the preparation of a learning programme for extended periods of time, what in teacher parlance is often referred to as "long term" planning. It is separated into two parts, first, planning programmes; and second, planning units. Planning the content of a classroom programme with students for a sustained period, such as a year or term, was not possible in the view of all the mathematics teachers (see also Chapter 5: 5.1.1.2, 5.1.2, and 5.2.1.2). They shared the strong sentiment that they could not co-construct programmes with students because the major topics for mathematics in even junior year levels, were scheduled across the department for the whole year, and were aligned for common

assessments (see Appendix N). So the order and designation were inviolate. Other constraints, such as the prescriptions of qualifications (e.g., National Certificate of Educational Achievement, NCEA), were seen to preclude this practice in senior classes. This situation was similar for some other senior subjects, for example, art history (Roy, II. p. 24).

However, within this restriction the art history students noted their choice in the sequencing of topics: "We get to choose … what topic we can start with" (Royss, 26/6, p.1). Another senior student gave similar examples from drama and media studies:

> because we've got so many achievement standards and we choose the ones that we want to do first and then our teacher will say, "Well we'd rather leave this until the end because then it's fresh in your memory," or whatever … because you'd rather have everyone concentrating on something they want to do to start them off ... it just gives us a lot of control of what we're actually learning. (Mary, 19/3, pp. 6-7)

However, for the same teacher, art provided a different scenario, with co-construction of the content of the programme commonplace in his practice, developed and differentiated with individual students:

> I've been co-constructing ever since I've been teaching, not all the time, but certainly with some classes. For example with the 5th, 6th and 7th form [Y11, 12 and 13] I've always co-constructed, because with the 7th form there are so few people that you can. The programme itself is quite individual and the whole idea behind it is co-construction and … it's the process you're teaching really, and the content is something that they choose, and work with and look for models. (Roy, II, p. 7)

> In senior art you can pick any style, any model you want to really. I just show them restrictions, so for example, in design if they want to design the interior of the Concorde … it's a little bit hard in one year, and … "I want to design a racing car" … they have a team of 2,000 designers [to] get Ferrari to look the way it did … or they want to design a track shoe … so you try and … bring them down to a ground level so that the choice is something that they can handle in a year. But at the same time it's got to be something that *they* want to do, because of the amount of time *they* have to put into it ... the journey is as important as the end product. So with

> them that's done like that … negotiation. I'm not left out of it, I am part of it. (Roy, II, pp. 25-26)

When teaching a computer class (an area he identified as outside his areas of expertise) the same teacher had also chosen a co-constructive approach to determining content and the way the learning would proceed. The ten-week unit was adapted with students, who then identified the experts in their own groups as helpers, and through on-going dialogue with the teacher, the class worked through the unit (Roy, II, pp. 17-18).

Students seldom recollected involvement in planning their programmes. Only two mentions were made, both by junior students, identifying memories of such input in physical education (PE) (Tomss, 25/6, p. 2), and social studies (Raess, 27/6, p. 6). A Y13 student of photography identified a difference between the pedagogy of subjects (see further details in Chapter 5: 5.1) as shaping the possibilities of co-construction in programme planning:

> Also, it depends what subject you're doing. Like, in photography we do a lot of it. I mean it's basically all your own work and the teacher's just there to guide…. We have to choose our own artist to research; so it's basically a 'do-it-yourself' subject. (Alice, 19/3, pp. 3-4)

In terms of planning of a unit (a topic study which lasts several weeks) in mathematics, it was the exception for teachers to set out to involve students. Art history again provided a counter example; students reported being consulted in some detail about their next unit: "Quite a lot. What we are going to do for our seminars and when we've got to do them" (Royss, 2/7, p. 1).

However in Stage Two, both senior mathematics classes and their teachers co-constructed the revision unit for the three weeks that remained before the external examinations (Jack, CO, 23/10, pp. 1-6; Sam, CO, 30/10, p. 1). I observed one of these lessons where the whole class discussed revision content and methods. The teacher drew a grid showing the nine remaining hours over three weeks. Then there was a focused conversation between teacher and students, which included suggestions, requests, a developing consensus, and the ranking of importance of

topics. The resulting grid was a topic framework. The content students identified tied in closely with what the teacher was expecting from the gaps in knowledge revealed in the recent internal examination, and made planning easier (Jack, 23/10, p. 1).

Differentiation by groups and individuals was seen as essential within the agreed topic guide. The teacher recognised that everyone was at different points. There were "19 different issues" (Jack, 23/10, p. 1):

> It's certainly student-driven now and next time obviously will be about what other questions you have got coming back to me, what others of you have that same question, how are we going to deal with this, do we do it as a class or do we do it as smaller groups as you suggested? (Jack, 23/10, p. 6)

Students from this class and the other senior mathematics class identified revision time at the end of the year as a time where co-construction of content occurred with greater frequency than at other times (Jackss, 4/11, p. 1; Samss, 30/10, p. 1).

A Y9 class also co-constructed the revision content they needed to prepare for the end of year examinations (Joy, 11/11, p. 1). They identified this as an opportunity for them to have input into their classroom programme: "Those sheets we had to fill out what we didn't know … for our exams, so we can study on those ones" (Joyss, 11/11, p. 1).

Despite the limited use of co-construction to determine content in programme and unit planning, some teachers identified possibilities for greater future student involvement in unit planning in certain areas. One teacher saw the potential in areas of the Y13 mathematics with statistics curriculum for students to be involved: "you'd have an opportunity to build with the students, the particular direction that you could take them" (Jack, II, p. 4). (See also Chapter 5: 5.1.1.3.) Another teacher foresaw similar potential for junior classes (Tom, II, p. 7).

4.1.1.2 During learning

As revealed above, there was limited co-construction between teachers and students of the initial planning of content of annual or term programmes, or units,

particularly with the mathematics classes. These topics and their sequencing were usually set. The reasons included teacher tradition, availability of resources, curriculum requirements, department processes, and qualification prescriptions. However, once units were underway, there were often openings for co-construction over the details and emphasis of what was to be learnt within a unit, or for student choice. One teacher described how during the course of a unit they would involve the students in providing ideas of content and how they would proceed for subsequent lessons, which guided her planning and resource search:

> Most of the co-construction that I did, it wasn't so much for how we're going to do our lesson *there and then* [emphasis added], because I don't really know how to use it in that way, it was more for planning ahead. So after we'd had a session about … what we've got to do and how should we do it and all that sort of stuff, I'd generally get them to write down their comments and then we'd talk about it, and then I'd come back the next time and hopefully have things that they'd asked for. So it was more that it would have an impact on my planning I guess and the resources I would try and get together. (Rae, II, p. 10)

Also, many lessons required students' involvement in decisions about certain aspects of content. One of the emphases that emerged from teachers' reflections was the flexibility that is characteristic of an interactive co-constructed classroom curriculum in both its content and method, from what might have been planned. The lesson is described as organic: "[it] shaped itself" (Tom, 19/6, pp. 4 & 7), as decisions are made "on the hoof" (Tom, 25/6, p. 5; Jack, FI, p. 2) by the teacher, often as a response to the unpredictable interactions and reactions of students (see also Chapter 5: 5.2.1.2. and 5.3.1.1). More and more, they identified that the teacher was a learner about their students' learning and often about aspects of content such as the students' gaps and misunderstandings.

It is important to note that in the descriptions of the findings that follow there is sometimes a blurring of the distinction used between content and method as the interactions in a lesson unfold. The formative interactions, the questions, the answers, the feedback and feedforward can become how the students learn.

This section first details accessing students' prior learning, which was a universal co-constructive practice amongst the teachers. Second, the use of students' interests to co-construct the particulars of the content in a unit or part thereof, is illustrated. Third, other methods that teachers and students used to co-construct content during the learning are described.

Most of the teachers reported in the initial interviews that they accessed students' prior knowledge at the beginning of each unit or topic to refine the intended learning pathway from the strengths and the gaps in learning that this process identified. For example, one reported brainstorming as a technique, but often to see what students already know, rather than give students the major say:

> Before we start a new topic, I'll brainstorm with them what they know, and I'll list it all on the whiteboard or get them to. I think generally though I've got a pretty clear idea of what I want to do with them, but I will try and ascertain from them what they already know, and see if there's things that I can do a little bit less of, or that I need to do a little bit more of.... (Tom, II, p. 8)

This practice was also commonplace during the course of the learning, to diagnose gaps in students' learning within a topic. This might be done on a weekly basis, daily or as needed. The feedback from these interactions helped guide the teachers' decision-making about the classroom curriculum and subsequent planning. A range of strategies was used, such as a recorded brainstorm (Joan, II, p. 8; Rae, II, p. 4); a 10 minute quiz (Sam, II, p. 9); a pretest "it gives them an idea of where they are going" (Joy, II, p. 14); or a diagnostic assessment (Jack, II, p. 6).

On occasion, this introductory activity enabled the teacher to co-construct the detail, pathway and context of the intended topic with students to increase its relevance to them:

> some questions like, what is it you want to find out … and that sometimes can stem towards, well that's what we were going to be doing, this will be the work towards it…. I always try where I can to relate something to the real world and then they are able to then somehow try and form a context in which to ask questions. (Joan, II, p. 9)

From the reflections, classroom observations and meetings in Stages One and Two, came further substantiation that the practice of accessing students' prior knowledge in a variety of ways was commonplace (Tom, 19/6, p. 1; Sam 27/6, p. 1; Jack, CO, 26/6; Joan, 18/6, p. 3, 4, 5, 12; brainstorm, 3 responses, mindmap, cooperative games, use "can do" sheets, Meeting, 25/6; rally tables, Raess, 19/6, p. 4; Rae, 11/11, p. 1).

Some student groups recognised their teacher's practice of finding out what they knew about a topic as providing them with opportunities for input:

> When we're learning a new subject [topic] or something, he'll ask us if we know anything about it and like we'll just all tell him what we know … heaps of things, practically there's a whole lesson he asks us "So what do you know about that? Do you know anything about that?" (Tomss, 28/10, p. 3)

One senior student explained how this practice was helpful to her learning: "It's good when the teacher says, "What do you know already?" because then that gives us a start-off and then we can work on the things we already know, like build it up" (Mary, 19/3, p. 7).

In addition to assessing students' prior learning and using these co-constructions to influence the specific content in a range of ways, other possibilities were identified. One teacher explained that within a topic area he would try to find what students' interests were, and use this as a focus:

> probing with the students to see is there a particular area that they would be interested in from the … topic area that you're currently doing and I think then it allows that feedback from the students to be able to move in the direction, and channel their thoughts to say well, how about you look at this or we look at this and as it is I can see an area of interest that they've got. (Jack, II, p. 5)

Another strategy was to develop open-ended learning tasks that involved some areas of student choice or determination such as developing content within particular guidelines. For example, a statistics unit used in two junior mathematics classes required students to generate the details of their task with a partner (Joan's and Joy's statistics unit in Stage One, CO, 18/6-2/7). There were several examples

I observed, where concerted co-construction between the teacher and a pair of students occurred to assist in the development of the task. The pair of students had to co-construct specific content. Students identified their input in developing their own inquiry topic for this assignment: "We knew we had to do a graph … but we got to choose what question we wanted to ask. /We had to do a question with girls versus boys" (Joyss, 30/6, p. 1). From the two classes a broad range of topics was generated from "how tall you are. /Feet lengths/ … arm spans/school bag weight" (Joyss 30/6, p. 1), to how many rugby attended games in a given time (Joanss, 2/7, pp. 1-3). There was an occasional mention by students of use of a similar strategy in other subjects, for example: "[In PE] we make up our own games" (Tomss, 25/6, p. 2).

Teachers and students identified a range of interactions and strategies that promoted co-construction of content during lesson episodes. Teachers used well-known strategies, for example "post box" (a strategy where students anonymously answer questions, then collate and present the class responses in groups), as well as interactions with the whole class, groups or individuals. Many of the interactions consulted students, required students' participation, or developed a learning dialogue, using questions and answers. Although most of the initiative lay with the teacher, there were also interactions initiated by students that encouraged co-construction of content within the lesson. These findings were included to demonstrate how many of the interchanges that constitute effective co-constructive practice may be brief, are built incrementally in conversation by the participants in the throes of the lesson and could be easily overlooked as they are not major strategies, or formally planned. Many could be labelled formative interactions as the content and learning process become intertwined. They are grouped into the following sections: teacher questions, students supplying content, student answers, student choice, student questions, and other actions.

Teacher questions

Teachers identified numerous ways that they used questioning, both oral and written, to promote co-construction. They also used a great variety of types of questions depending on the types of thinking and response they wanted from

students to identify where students were with their learning. A range of examples follows that illustrate this.

One teacher asked the class what content they covered with the relief teacher while he was away (Tom, 25/6, pp. 1 & 3). He explained that for him this removes assumptions about what happened, helps rebuild relationships with students, develops a bit of dialogue, and feeds into the decisions about the content of the current lesson (see also Chapter 5: 5.1.1.2).

Teachers commonly used probing questions to clarify students' reasoning and understanding: "I was doing some questioning on how they got an answer, that would confirm to me whether they did or they didn't understand" (Rae, 21/10, p. 3). (Sam, CO, 27/6, pp. 1-4). Another technique identified by both teachers and their students was the teacher asking the students if *they* had any questions (Jackss, 28/10, p. 1; Samss, 4/11, p. 3). This helped promote opportunities for students to explain what they did not understand (Jack, 2/7, p. 5); in effect they were inviting students' input (Tom, 25/6, p. 3).

Several teachers made conscious efforts to continue the conversation and effort of the student, by not answering a student's question, but rather turning the question back to the student (Sam 27/6, pp. 1 & 6; Jack, CO, 26/6, p.5; Tom, CO, 25/6, p.7), and getting them to answer questions (Sam, 17/9, p. 1). This strategy was used to encourage students to think, learn and to have input.

Students supplying content

Another strategy identified by most of the mathematics teachers was asking students to make up their own questions for the class or each other. For example, this was used in the revision section of a lesson where certain volunteers put questions on the board for the rest of the class to answer (Joy, 28/10, p. 1; Kate, 23/10, p. 2). One teacher described the process as involving asking students about the focus topic: "What do you want to do the revision on? What do you want to concentrate on today, sort of thing" (Joy, II, p. 7). And then:

> getting them to work out what revision they want to do on the board each day. Group one's turn today, group two's turn … and

> sometimes I have to change it, and say no, I am going to do it today, because I want a bit more revision going on here. But usually they are pretty good. So that's what we do and we are starting the class off with them. I either put it up and they come up and do the answers and they decide between themselves if everyone has got the answer and that's what they agree on. Or else they decide what revision they think we need to do for the day. (Joy, II, p. 4)

In Joy's class, students recognised this as a chance to steer the content of the lesson: "It would have been our best opportunity this morning, for revision, when those people they got up and put some questions on the board. They volunteered to do a question" (Joyss, 28/10, p. 1).

Student answers

Students providing answers to questions or exercises undertaken by the class was also commonly identified by teachers (Joy, 23/10, p. 1; Kate, 23/10, p. 2; Joan, CO, 18/6, p. 3; Tom, 19/6, p. 1; Rae, 19/6, p. 6), and students, as a means of co-construction of the content of learning. Junior mathematics classes often started with a review session, named "Quick Ten". Students from these classes frequently viewed their oral answers to these questions as a form of input into the classroom curriculum: "Like when we have the warm-up at the start, like the quick ten or whatever it is" (Joyss, 17/6, p. 1); "In just answering the ten questions and that" (Tomss, 28/10, p. 1); "Calling out the answers" (Joyss, 23/10, p. 1). Though the language used by both teachers and students to convey this may seem like a traditional teacher initiates - student responds (I-R) pattern, it proved more complex in reality. With few exceptions, these exchanges became the vehicle for conversations between class members about points of interest, understanding or misconception, exposing content areas for further explanation or instruction, questions or discussion. The following examples clarify this process.

Often student answers were written on the whiteboard or some other communal facility, either by individuals or groups, to share with the whole class. Some students in all the junior classes identified this as input (Raess, 19/6, p. 2; Joyss, 17/6, p. 1; 30/6, p. 3; 23/10, p. 1; Samss, 27/6, p. 2).

Besides providing the answer verbally, or writing it on the whiteboard so it could be shared with the whole class, there was often an expectation on the part of the mathematics teachers that students explain the process: "how they got answers". (Sam, CO, 27/6, p. 2; Rae, 19/6, pp. 3-4). For example in one lesson observed, some students were telling the teacher how to do the pie graph, and were giving the rest of the class an idea of how to get there (Raess, 19/6, p. 2). Teachers explained that there is often more than one way to get to an answer. There were several examples in the observations of different students providing answers to the same question but explaining a different pathway to reiterate to students this idea (Tom, CO, 25/6, p. 2; Rae, CO, 19/6, p. 3; Rae, CO, 27/6, p. 4). One teacher explained this practice as requiring students to keep thinking (Rae, 12/9, p. 2), and one student recognised it as a co-constructive process that helped other students to learn:

> The teacher selects a couple of people to say answers and they usually go up to the front, say the answers and if there is any disagreement we have a discussion about how to work out the answer, write the right answer up. We use our own answers and information to help other people learn. (Raess, 11/11, p. 2)

Student choice

Students making a choice was identified by both teachers and students as an element of co-construction of content. Several teachers reported that the practice of giving students the choice of examples to work on was relatively common (Kate, 23/10, p. 3). One explained his rationale and means of differentiation:

> If we've got to be doing a bunch of examples … I'll let the kids choose the ones they do. I'll let them correct them. I like them to be choosing the work that they're doing. I might give them some guidelines … you need to do five or six of these examples, but you choose them. And then I might steer them a little, especially the more able ones … I might say well … make sure you do a couple of the higher numbered ones which tend to be a bit harder and other kids will say well you steer away from those, but definitely engage them. (Tom, II, p. 6)

He later described the use of a continuum, as a co-constructive strategy that "worked an absolute treat", to facilitate the grouping of students to work on equations of varying difficulty. Examples of equations provided by students,

ranging from simple to hard were sequenced on the whiteboard. Then students were asked to stand in a continuum where they would be. This self-selection provided "three absolutely perfect groups" (Tom, FI, p. 2).

Some students also gave an example of voting to choose the sports they play in a period from PE (Tomss, 25/6, p. 2).

Student questions

Questions initiated by students, as distinct from those resulting from teacher prompting or requests, were identified by both teachers and students as a major technique of co-construction of content. Many students, both junior and senior, identified *their questions* as fulfilling a range of student needs from clarification and reiteration, to meeting an individual's learning requirements (Raess, 19/6, pp. 1-2; Samss 4/11, p. 3; Jackss, 28/10, p. 2). Most teachers felt students appreciated being able to ask questions and make suggestions that might "drive" the course of the lesson (Jack, 2/7, p. 11). However, some students were not of the same opinion (see Chapter 5: 5.3).

Teachers were also very aware of the potential significance of student questions that might signal misunderstandings and the need for teacher action in the co-construction of the content of a lesson. It meant that they needed to listen carefully to what students were saying. For example, in one class observation a student asked, "What is area?" (Tom, CO, 19/6, p. 9). The teacher identified this student as fulfilling a spokesperson or signaller role (Tom, 19/6, p. 7), and moved the lesson content to cover this important prerequisite concept. It was not where he had planned to go, as he had assumed students' knowledge of this concept. He explained his reasoning in a later lesson:

> It becomes really clear what are the points … to reiterate back to the whole class because I always work on the assumption if somebody's making a mistake in what they're doing, other people will be, and kids aren't good at acknowledging their own mistakes often, so if … I can see it, particularly with two of them…. (Tom, 28/10, p. 5)

Some students also identified the importance of this questioning role: "Most of our input I guess comes from what questions we need, we can't figure out, by asking, 'cause most people don't get it" (Samss, 30/10, p. 1).

These examples show that there was a reliance on communication, both listening and speaking, observing and reacting, in these classrooms.

Other opportunities for co-construction of content

A common teacher practice was to provide examples of real life situations to make connections to the content being learned. For example, in a Y13 statistics class, the teacher used the accuracy of Colmar Brunton polls to illustrate the possible confidence interval of a survey (Jack, 2/7, p. 1). A Y9 class was trying to come up with a formula for patterns, and the teacher provided the context of a garden and tiling a path (Rae, CO, 12/9, pp. 6-13), and it was to this that she attributed the quality of their learning: "They worked really well and they were discussing with each other and everything, but I think it was maybe putting it into a context" (Rae, 12/9, p. 3).

It was also usual for students to suggest examples from their lives to provide examples and contexts. To exemplify the difference between two means, a student explained the difference in size between the leaves on the light side and dark side of a tree (Jack, CO, 2/7, p. 2). Maps and architectural plans were student contexts for enlargement (Rae, 11/11, p. 1).

Teachable moments were another example of co-construction of content (Jack, 2/7 p. 5). In one lesson a student got up and turned a power point switch off. Her comments indicated she thought this was stopping power from being wasted. The teacher picked up on this and provided an interesting anecdote to assist her learning about this.

Discussions and debates were commonly identified by both senior and junior students (and teachers), as opportunities for student input into the content of the classroom (Raess, 27/6, p. 3; Roy, 26/6, p. 5; Tom, 19/6, p. 2). It gave students

opportunities to share perspectives and ideas (Roy, 26/6, p. 8; 2/7, p. 3). Indeed, some students indicated that they purposely initiated discussions (Royss, 2/7, p. 6). To research their own information and notes (Katess, 23/10, p. 1) was identified as an area of some control of content by some students.

At least two teachers felt students making mistakes was an important action in co-construction of content. Such situations could impact on how the lesson developed (Tom, 25/6, p. 7). There were issues around students' comfort to make errors (Sam, 27/6, p. 9), and whether the teacher was attuned enough to recognise the students' misconceptions and build on them (Sam, 27/6, p. 4).

4.1.1.3 After learning

The formative interactions in the previous section illustrate attempts at co-construction, with the ongoing adaptation in a dynamic fashion of the content of the classroom curriculum through these interactions between teachers and students. This section illustrates the use of co-constructive practices in three aspects of the classroom curriculum that usually occur as endpoints to learning. First, summative assessments; second, evaluations of lessons, units or programmes; and finally reporting to parents /caregivers.

Aspects of the content of summative assessment can also be co-constructed between students and teachers: "How will we know, and show, that we've found out when we've finished?" (Cook, 1992, p. 21). The involvement of students in setting up the criteria of an assessment in art was one example mentioned (Roy, II, p. 25).

All the teachers in the junior mathematics classes used "can do" sheets (see Appendix L) to explain to students the criteria that would be the focus of learning and would be used in their assessment of the topic. There was space for additional criteria to be added in the format used:

> We do those "can do" sheets at the beginning of every topic and that way I explain, "This is what we're doing, know that we're getting ready for achievement standards in year 11, this is what

> you have to be able to do to get achievement, this is what you have to do to get merit ….” (Joy, 11/11 p. 8)

Students identified this checking sheet as a way the teacher shared with them the intent of a unit:

> S. We have a sheet that we check to see what we need to learn, and if we’re good at all of them then we might get a merit, excellence…
>
> S. Yes, she gives it to us before we even start learning the stuff.
>
> S. That’s your homework.
>
> S. Lists everything that you’ve learnt. (Raess, 12/9, pp. 4-5)

However, their teacher queried whether sharing the criteria for assessment is co-construction or whether it required students’ input into the development of the criteria: “even though they didn’t have an input into what was on the sheet?” (Rae, 12/9, p. 4).

Evaluation of aspects of the classroom programme, units or lessons was reasonably common. It was distinguished as formal or informal depending on criteria, which varied amongst the individual teachers. One teacher called it a “debrief” and in one example used rally table and negotiation game strategies to access students’ viewpoints about the programme and their learning:

> At the beginning of term two, I got them to do a rally table based on their recollections, impressions, thoughts of term one maths in a high school the first time up. And I totally accepted what they put down, and one group were very scathing of it … it was an assessment of me, and my programme and their learning … it was like “What do you remember? How far did you get? What were your concerns? What did you enjoy?” And they did it on their stickies … the eight key points and … it was that negotiation game, and it was good … it was interesting. There were four groups I think and each group had a really different slant. (Tom, II, p. 9)

Another teacher observed asked students to provide a written evaluation of a lesson. This was impromptu, and was asked for towards the end of the lesson, following the teacher’s sharing of her disappointment about aspects of the lesson

and students' reactions. The hope was to gain students' perspectives to build on for the following lessons (Kate, 30/10, p. 4).

Another teacher undertook a more formal evaluation of a unit of work on measurement (Joan, Stage One) to find out students' perspectives of the choice and input required of them in developing the unit. There were also several examples of teachers asking for oral feedback on part of a lesson or the whole lesson (Rae, CO, 21/10, p. 6; Tom, FI, p. 3).

Three teachers described students' involvement in co-constructing aspects of the content of their written reports to parents/caregivers. They showed the draft reports to students. As one explained, there should be no surprises:

> I tend to … let my students see their report form before I send it out because, one, they can check my spelling. But two … it's like staff appraisals, there should be no bombshells. A student should know what type of report they're going to get a month in advance, and if they think they're going to modify their behaviour in that last week for a report, then they know they have to start moving … they can ask me to modify it as long as they can explain. (Sam, II, p. 12)

Another explained co-construction of grades for personal work habits with students that allowed clarification of the requirements of the criteria. In comparison, "curriculum" reporting was based on assessments that were not discussed:

> … for criteria … things like homework, personal organisation and things like that. I have in the past got them to come up and read the descriptives and tell me what they think their grades should be, on the understanding that I might not necessarily put that grade down, but then I can see where they think, compared to where I am at. And then I might say to them well you know you have given yourself a 1 for homework but in actual fact I have noted you've done it 5 or 6 times so I would not give you a 1, I would give you a 2 or something like that.… The curriculum reporting has been on the assessments. (Joan, II, p. 11)

Students' attendance at, and participation in, reporting interviews was encouraged by a majority of teachers (Joan, II, p. 11; Jack, II, p. 7; Roy, II, pp. 26-27; Joy, II, pp. 8-9), who would like more to take up the invitation. Its benefit was explained:

> We've always strongly suggested that students do come together there and even 7th formers do come along to the interview with their parents, and talk. And often it's very handy to have the student there. Just so that it's not one way between the parent and yourself, the key person being left out of the triangle. (Jack, II, p. 7)

This section has explored in a broad manner the many ways in which students and teachers can co-construct the content of the curriculum. Next, aspects of how students and teachers co-constructed the learning process are explained.

4.1.2 Co-construction of the learning process: "How students learn"

The following findings about co-construction of the learning process are formatted broadly into the generic requirements about the classroom environment for learning, and specific requirements for learning to occur.

4.1.2.1 Classroom environment

To develop an environment conducive to optimal learning can be a challenge. Although particular types of learning may require quite different conditions, teachers and students distinguished certain generic expectations that would underpin the co-constructed classroom learning environment, and provide a platform for specific programmes. Nearly all the teachers acknowledged some negotiation with students in this area to clarify expectations. On occasion, the focus was explained as the development of a particular relationship between teacher and students, based on honest dialogue: "an atmosphere where people will be quite frank with me, which doesn't always happen, because of age difference … but I try and get that sort of system" (Roy, II, p. 39). Other aspects covered include rules of conduct, choice of seating and workmate, and pastoral care.

Many of the teachers said that they consulted, particularly junior students, early in the school year to generate classroom rules (Rae, II, p. 3; Joan, II, p. 5), or a class code of conduct (Joy, 11/11, p. 7; Sam, II, p. 13; Joy, II, p. 9). In some instances

the guidelines related to particular learning situations such as working in groups (Joan, II, p. 6). When talking of such negotiation teachers often expressed a concern about coercion, as though they should not be part of the process or have any ideas of what were sound ideas.

Some students remembered being involved in developing rules to make their class function well, such as whether eating was acceptable and what tools were needed for class (Tomss, 19/6, pp. 2-3). One group of students remembered it as like a treaty incorporating specific classroom and schoolwide expectations (Raess, 28/10, p. 6). Many of the teachers gave students a choice in where they sat, or in the constitution of groups to work with (Sam, II, p. 13). However, responsibility might accompany this freedom: "They are basically told that if they break the rules, then they have to shift to where I want them to sit" (Joan, II, p. 6). Many junior students also acknowledged that being given a choice of seating, groups or who they worked with was a way that they had input into the class (Joanss, 2/7, p. 6; Joanss, 18/6, p. 1; Joanss, 30/6, p. 2; Joyss 12/9, p. 4; Joyss, 11/11, p. 3). And it seemed quite a common occurrence across subjects (Joanss, 30/6, p. 4; Raess, 21/10, p. 2). Seniors said that they sat where they liked (Samss, 30/10, p. 1), a situation that was taken for granted by their teachers (Sam, 21/10, p. 3; Jack, 23/10, p. 6).

Pastoral care was another factor. Teacher interest in students' wellbeing and other aspects of their lives was generally seen as being an important contribution to enhancing the relationship with students and so to assisting the potential for learning of particular students:

> If they feel that you've some sort of understanding of where they're at, even in a way of where they're at in their lives … I think that really aids … just the relationship, and so that always aids how they're learning. (Kate, II, p. 7)

Other examples emerged in later stages of the study of teachers' interest and knowledge about their students, where students were aware that the teacher was giving consideration to their other commitments. For instance, Tom negotiated the timing of a test for students who had been on camp, around their *kapa haka*

(Māori dance group) involvement (Tom, 28/10, p. 1). Students identified this negotiation as a positive thing, as they had been away on camp, and had not had much time on the topic or to revise. It was seen as being far more considerate then being told "You have a test today" (Tomss, 28/10, p. 2). In another instance, a teacher made special arrangements to accommodate a student's learning needs because of his knowledge of her bereavement (Sam, FI, p. 13).

4.1.2.2 During learning

Teachers and students identified a range of foci for their interactions during learning to facilitate optimal conditions. These included how the learning would take place, issues of time, group work, and developing new ways of acting when learning in the classroom.

Negotiating how learning would happen

None of the mathematics teachers undertook formal planning with students as to how they might learn various topics before a unit commenced. There were, however, many instances observed or described, of such co-construction that occurred during a unit. These interactions within the lesson, usually took place in a manner that one teacher labelled "informal" in contrast to the more "formal" planning of a unit from its beginning. "Informal" for this teacher seems to equate with the co-construction being oral, unplanned, and not recorded in writing:

> Only so far as to get the kids to suggest which activities they like and … so we might do this type of activity again another day, but not to … put up all the things on the board about what we have to cover and you know how would you like … [to learn this]. Not in that sort of formal sense, only in a very informal feedback type way. (Rae, II, p. 5)

The same teacher described how during the course of a topic she would involve the students in providing ideas of how they would proceed: "like these are the things that we've got to learn now, how can you suggest we might go about learning them or what sort of things would you like to do and that sort of stuff" (Rae, II, p. 3). Such consultation occurred in most classrooms (Joy, 11/11, p. 3; Tom, 17/9, p. 1; Jack, 23/10, p. 1; Sam, 21/10, p. 3). Another teacher described

the ways students had considerable input into the curriculum of many lessons by making suggestions about a change of activity:

> I'm prepared to listen when they suggest that we should be doing something different, they want a break, you know: "Well can we do this today, sir?" or "Can we play …? A couple of the games they've been doing just as part of the cooperative learning, the kids are really loving, and they'll often say to me "Can we do this today or …" and I will generally if I can fit it in … or I might not be doing it that day but I might say "Well let's do it tomorrow," because it's very viable. (Tom, II, p. 6)

In other examples, two senior classes had co-constructed their revision programme for the weeks of the year that remained. One teacher explained his offer to fit students' needs more aptly with a differentiated programme rather than having everyone at the same point:

> Here's the finite length of time we've got, how we're best going to use the time, and you are the key ones that are going to tell me how to do it. "What are your issues and how can I best serve your needs over this period of time?" … I realized I could force-feed them through some of the things, but it might not have been the things their weaknesses are in. (Jack, 23/10, p. 1)

The other recalled how his students wanted to use his expertise in the weeks that remained. This involved having input into the sequencing of the content to be worked on (Sam, 21/10, p. 3), and giving the teacher clear messages about when they wanted his instruction and when they wanted to differentiate their learning to follow individual pathways:

> We co-constructed this on another day … they don't want the big spiel from me. They've had a couple of tutorials outside normal time, where they said "Tell us all there is about let's say complex numbers" … whatever, they've asked for that, but at the moment they don't want that spiel … they're into their different books, into the different exams and … they're trying those. (Sam, 30/10, p. 1)

In another example, a teacher reported a learning conversation that occurred when she explained the reasoning and constraints behind her decisions about method and how this improved the class tone:

> I'm doing algebra at the moment and they are moaning away when we are solving equations, and I say "This is how you have to set it out." "Oh we can already see the answer, so why do we have to do the working?" Right so I put all these really hard ones up on the board and they just have a ball trying to work them out and "So now do you see why you have to do the working?" And … it was a whole different feel to the class, you know they [had] got quite grumpy with me - "Why do I have to do this?" (Joy, II, pp. 15-16)

The art teacher described examples of co-constructing the methods of learning with individual students as part of the continuing formative interactions in the classroom programme. He had students keep a diary to record the substance of their one-to-one conferences in practical art (Roy, 26/6, p. 13):

> You can go around co-constructing with individuals quite easily ... I find that my art history fits into it perfectly. It's easy to operate in a group system and co-constructing … like with a seventh former, how will you learn this? How do other people learn it and do you know methods of learning, and co-constructing that kind of thing. … it's good to show models of good learning and practices, like what do you do [to] study? But they have to be answerable … I talk to them about it and I say …"What's your space like at home, and … how do you study?" (Roy, II, pp. 23-24)

Another teacher explained the dimensions of student input she permitted as being quite limited, perhaps involving a choice such as their writing notes or being provided with them: "it's not usually any major decisions, it's normally stuff that won't change what I've got planned too much, but at least it makes them feel like they've got their bit of a say" (Rae, 11/11, p. 5). The ensuing student feedback was that they recognised they were being offered a choice, and appreciated being able to decide how to work on tasks, and learning how to do them:

> And we have choices like if we want to do examples like Miss will go to us "Do you want to write stuff down or do you want to use sheets and stuff?" and we get to chose which one we want. (Raess, 11/11, p. 1)

Another choice students remembered was about how they would present their task: "It's not just a choice of doing anything, it's a choice like … if you had to present something, you get to choose what way you want to present it" (Raess, 28/10, pp. 3-4).

One teacher and his class were being visited by a group of Resource Teachers of Learning and Behaviour (RTLBs) and filmed, and so in this special circumstance he planned with students how they would go about the demonstration lesson. He explained the reasons why he thought it important to negotiate the terms of this undertaking:

> … the importance as to what to do this afternoon because it is a bit of an imposition on them. So I was thinking I need some buy-in from them, so if they can help me plan it … a lot just to get them to come to the party I suppose, for this afternoon's little presentation, when really they would prefer to be elsewhere, either doing their speech contest or doing their English. So I needed to get them on side and that seemed like a good way to start … I knew how I wanted them to do it. It was just a matter of getting them to *suggest* that they do it that way. (Tom, 17/9, p. 1)

The students remembered their part in the decision-making and felt favourably about it: "We just decided how we wanted to do things…. Whether to do those activities in groups or like together or individually" (Tomss, 17/9, p. 1); and "It's cool/Because you get to have your say/To say what happens" (Tomss, 17/9, p. 2).

Some students were cognisant of their agency in the classroom and used a variety of interactions to inform the teacher of their viewpoint. One was to tell the teacher that the choice of pedagogy was not having the desired result for their learning, a strategy which they felt was not always welcomed by the teacher: "Like with that woodwork stuff we said that we are definitely not learning and he was like … he got quite annoyed" (Jackss, 4/11, p. 3).

Another student explained how he initiated learning conversations with the teacher to ask for help:

> When I'm not understanding the work and stuff and I'm not getting it, I just go for it and say I'm not getting it. Before we start to learn, just go and have a little talk to him and then just tell him about … like if you're having problems with like say algebra or … you can just go to him before the class and he can just go over it a few times and then carry on. Whether that question is right or wrong…. (Tomss, 17/9, pp. 3-4)

Likewise, a senior student explained how he would go and ask the teacher for assistance (Jackss, 28/10, p. 2).

Both senior and junior students also explained that dependent on their motivation, they were able to regulate what and how they learn through setting the pace: "Some input into classes would [be] … how much work we do … because what we want to do we do, and the work we don't really we go slow" (Raess, 11/11, p. 1); "We work pretty much as much as we want to" (Samss, 30/10, p. 1).

Time

The negotiation of time spent on particular learning or tasks was a common topic across most classes. One teacher recalled explaining time constraints to students, why they needed to increase the pace of coverage, as an assessment across all the subject classes of their year was approaching (Tom, 25/6, p. 3). Another described the co-construction of timing and methods employed in extra tutorials prior to external examinations (Sam, 21/10, p. 7; 30/10, p. 1). I also observed the negotiation of the timing of a tutorial on calculators between this teacher and his class (Sam, CO, 4/11).

Students in both senior and junior classes identified time as an area of co-construction. They felt comfortable to request more time for their learning: "If we are struggling we can say 'Can we have an extra period on this?'" (Jackss, 28/10, p. 1) "You just ask him, I do. And like when we're doing activities, we're really into it sometimes and he goes "Time's up!'' and we go "Oh no, just a couple more minutes?" "But why?" And I go "Okay just a couple more minutes" (Tomss, 28/10, p. 3). When this was recounted to the teacher, he expressed surprise, not having categorized time as an area of co-construction:

> Yeah, I actually hadn't thought about a time one. Obviously if they are doing something I am not going to stop them if they all howl and moan and protest. Sometimes you *do* have to stop them … like the girls today could have done with another five minutes down here, but everyone else had finished and it was time to move on. (Tom, 28/10, p. 2)

Students from a senior art history class described being able to have input into decisions about the dates that assessments are due, a situation that was replicated in their PE classes (Royss, 26/6, p. 1).

Group work

Throughout the study students working together in a group (Joy, 23/10, p. 1), "helping each other" (Joy, 12/9, p. 1; 6/11, p. 1) was the predominant format suggested and used by teachers for a co-constructive classroom. There was a variety of ways that groups were included into the approach. Cooperative strategies had been a feature of their PD in *Te Kōtahitanga*. *Expert groups*, a variation of jigsaw (see Chapter 2: 2.2.3), where students teach each other, was a favoured strategy of one teacher (Tom). Another came up with her own variation of "experts" using pairs of students, which sought to eliminate concerns she had over aspects of this strategy (Rae, 21/10, pp. 4-5). Another explained a widely-held belief amongst the teachers, that students talking to, and asking questions of each other, would better develop their understanding and improve their learning (Kate, 30/10, p. 1):

> The aim was really to get them to find the theory, talk about it rather than just writing or listening, and to try and get them working in groups and even so to do some examples but, hopefully chatting about it as they went, if they needed to. I didn't mind if they worked by themselves after that, but if they needed to, each of them should have known … because they'd had that input together. I thought they'd have more say in their work, they'd be more likely to say "Oh how do you do this one?" (Kate, 23/10, p. 1)

There was frequent acknowledgment by the teachers that in a group situation a lot of learning could occur: Students could discuss, question, teach, learn from each other, and co-construct with each other (Rae, 21/10, p. 1; 11/11, p. 3; Jack, 23/10, p. 6; 4 & 6/11, p. 4; Sam, 21/10, pp. 2 & 10). As one explained:

> I was hoping it would be between the kids today, that they would be co-constructing between themselves, discussing, talking things out with themselves, rather than being teacher-directed. I directed them and left them to it. Let the co-construction be amongst themselves. (Tom, 6/11, p. 1)

The same teacher explained how his use of a guided discovery strategy using materials (hands-on) in groups, rather a whole class strategy such as a brainstorm, could provide the opportunity for one student's prior knowledge to scaffold the learning of a whole group:

> Well I was really stoked when Malia over there she went "Oh I remember this", and suddenly bang she got the ordered pair bit sorted out and she'd remembered the co-ordinates and suddenly that gave her whole group a bit of a lift and that was one person's prior knowledge kicking in. Another thing, I could have done a rally table or a brainstorm or something like that with them to get their prior knowledge, but it wouldn't have worked today, they would have just sat there and waited for me to tell them, but by doing this they had something to fiddle with, they could make mistakes and I could correct them. (Tom, 28/10, p. 3)

Students likewise pointed out many positive attributes of working with each other that enhanced their opportunities to learn: "If you don't know something they can help you, and if they don't know something you can help them" (Joyss, 12/9, p. 5).

Changing students' understandings of how people learn

At times teachers acted to change the interaction patterns in their classrooms from what students viewed as the norm of what teaching and learning should be like, so that co-construction could flourish (see also Chapter 5: 5.3). Some of the actions taken around goal setting, making mistakes, and students as teachers, follow.

Several of the teachers made clear the goals or learning intentions of the lesson to students (Tom, 25/6, p. 4; Joan, CO, 18/6, p. 3), as this focus was thought to clarify for students what they were to understand and helped produce deep learning.

According to the teachers, making mistakes is a necessary part of learning. This message was stressed by most teachers in an effort to change expectations of the culture of mathematics classes. It was not necessarily easy to develop the attitude that this is a lever for further effort, thinking and discussion:

> I should have said it a lot earlier, it's okay to make those mistakes with your graphs, and Kelvin said, "Oh your graph's wrong", and they kind of gave up and I wasn't meaning that as a negative criticism, but they saw it as that. (Tom, 6/11, p. 3)

It was argued that students need to make mistakes (Tom, 6/11, p. 4), especially when a guided discovery strategy is used (Tom, 19/6, p. 19). But in general, a mistake is a strong cue in assisting learning through promoting dialogue about the error and what else needs to be considered or done differently:

> Oh I think the topic lent itself to doing and I knew they were going to come unstuck with things like multiplying negative numbers … and I wanted them to make those mistakes … especially when other kids, when they drew the graph and it was wrong and it was clearly wrong. I was pleased to see that, because it highlighted … you've done everything right, but you've made an error in your calculations, relied on your calculator. (Tom, 6/11, p. 1)

To help this change in the way students perceive errors, teachers themselves modelled that they make mistakes as they are learning (Jack, 2/7, p. 6). That the teacher is also a learner rather than an infallible expert, was emphasised by a teacher of senior classes asking for a few days to work on a problem before getting back to a student (Sam, CO, 21/10, p. 13).

Another focus in almost all the classes was for students to recognise and use the expertise of other students. They were instructed to ask other students first when they had a problem in their learning (Rae, 11/11, p. 5), and only come to the teachers after exhausting this option:

> Encouraging them to talk to each other as opposed to coming to me straight off, like when I decide that I want to focus on them working cooperatively together if they've got a question I try and get them to ask someone else in the group first … have you discussed it with others first and if they haven't then I'll encourage them to do that before I respond. (Rae, 11/11, p. 5)

This was affirming the role of students as teachers of each other, a factor noted by several students: "When all those people [student volunteers] were teaching Pythagoras' theorem and stuff" (Joyss, 6/11. p. 2). Another student explained jigsaw, which he viewed as a very positive aspect of a class he had been in:

> In there, the students teach the other students … we go into groups and have a piece of paper and we got to teach other students one thing so that you take it back to our normal group and teach them how to do it. (Joyss, 28/10, p. 4)

Students varied in their acceptance of this role of being "the teacher". Some described a very traditional picture of what they intended to do when teaching others (Raess, 21/10, p. 3).

Even in the senior classes, effort was made to represent mathematics as other than an individualistic textbook subject, by the use of many group strategies, use of equipment and the encouragement of students helping each other (Jack, Sam). The movement away from "spoonfeeding" (Sam, 17/9, p. 2), as traditional transmission instruction was termed, was however, not always embraced enthusiastically by all students (see Chapter 5: 5.3).

This section has described the numerous ways that teachers and students co-constructed their classroom curriculum, showing the way it can permeate many aspects of teaching and learning. Some important issues, which were raised by these findings, follow.

4.2 Discussion: Content and learning process

"In our action is our knowing" (Lather, 1991, p. xv).

This section explores several important ideas drawn from the descriptions by teachers and students of practices that gave them opportunities to co-construct. The issues are viewed in relation to current literature and the context provided by teachers' involvement with *Te Kōtahitanga*, the project that aimed to develop culturally responsive pedagogies for teachers of Māori students. In this, co-construction was promoted as a means of increasing power-sharing in the classroom (Bishop et al., 2003). The issues that will be discussed in relation to the findings about classroom practices are: the range of practices described, the issues that impact on teachers and their role, and aspects of students' viewpoints.

The range of practices

Any approach to teaching employs certain interactions and strategies in the teaching/learning environment, according to the way it professes to promote learning. For example, according to Bishop, the pedagogy of transmission or the traditional classroom stresses teacher instruction to convey knowledge, teacher monitoring that students do what they are asked, and perhaps contentiously, control of student behaviour through mainly negative feedback (Bishop et al., 2003; Bishop & Glynn, 1999). The focus on practices in the observations and the reflections in this study demonstrated that, in addition, some quite different interactions and behaviours characterized a co-constructed pedagogy. This emerged as having great flexibility, being organic, responsive, and often impromptu rather than following the step-by-step "lock-step" approach of the traditional planned lesson (Palmer, 2005, p. 1866). (See also Chapter 5: 5.2.)

It is common to find a contrasting table or a continuum used to explain how pedagogies differ (Bishop & Glynn, 1999, p. 147; Brophy, 2002a, p. x; Kinchin, 2004, p. 305). Scheurman (1998, p. 6), for example, uses a matrix to compare four differing takes on the role of the teacher according to the epistemological view adopted. Unfortunately, this seems to enhance the view that such pedagogies are mutually exclusive rather than "additive", or having common elements and some differences, and acknowledges that teachers (and students) will adopt particular roles according to the learning situation (see Chapter 2: 2.1, Bruner). All teaching requires some instruction (Scheurman, 1998).

With co-construction, the emphasis in pedagogy moves from monologue by the teacher to conscious dialogue with students, and between students (Mayo, 2002), requiring a shift in interactions, strategies and the roles of teacher and learner. In the following section the findings from this study about planning, prior learning, relevance, formative assessment, discourse patterns, use of groups, and areas of potential, are compared with other research.

Planning

Planning with students features in much of the literature that describes co-construction (Beane, 1997, 2005; Bishop, 2003; Boomer, 1992a, 1992b, 1992c; Cook, 1992; Lauritzen & Jaegar, 2002). Despite continuing to emphasise the need to plan the content of the curriculum of a programme/unit with students as an essential of co-constructive pedagogy, many teachers identified how their practice was restricted in this regard by departmental and qualification prescriptions. However, they came to recognise the potential of co-construction as a process that can permeate many other aspects of the classroom experience. Boomer (1992a, p. 33) explains how it continues in the "enactment" of the teaching and learning. Moreover, as teachers' confidence and awareness grew, certain contexts began to emerge as seeming particularly conducive to co-constructive approaches to planning content and as a way to begin, for example, revision units (Jack, Sam and Joy), subject areas outside the teacher's expertise (Roy), and senior Unit Standards classes (Rae, FI).

Prior learning

The universal use by the teachers of strategies to access students' prior learning parallels the literature on co-constructive learning, and maths teaching. "Associative link-making to students' prior experiences and knowledge is fundamental to the learning process and one of the recurrent and strongest findings in research on teaching" (Alton-Lee, 2003, p. 38). Accessing prior learning recognises that students come to the classroom with experiences and knowledge, and sometimes misunderstandings (Sewell, 2002). The teachers took cognisance of Bishop's message that "Prior knowledges of the students are seen as a major resource for learning rather than as either non-existent, irrelevant or problematic and that students are the best people to represent this knowledge" (Bishop et al., 2003, p. 200).

The importance of students' prior learning in pedagogy has had several decades of currency (e.g., Ausubel, 1963). It is perhaps for this reason that for most of the teachers, their recognition of the importance of prior learning predated the study. The examples quoted from the teachers, demonstrated their use of it to diagnose gaps and strengths in students' knowledge before and during the learning, using

many commonly known strategies. Students themselves identified how such strategies affirmed them as participants in the classroom curriculum. In other words, the teacher did not make assumptions about the students' knowledge, but rather set out to learn about the students, and to build upon what students brought to the classroom.

Relevance

Using students' interests to provide contexts for learning is widely acknowledged as an aid to motivation and good practice (Alton-Lee, 2003; Palmer, 2005; Rudduck & Flutter, 2000). This equates to Bishop et al.'s (2003) stipulation that Māori students be able to bring themselves, their experiences and culture to the classroom. The personal relevance of the content enhances its "meaningfulness" to students (Palmer, 2005, p. 1860). Previous research has questioned teachers' accuracy in judging what is of interest to students (Rudduck & Flutter, 2000). The open-ended tasks described in 4.1.1.2 of this study are an example of students deciding on this themselves. Scheurman (1998, p. 6) suggests that constructivist approaches have an affinity to such teaching "directed to open-ended enquiry". Students providing their own context to tie learning to life, was supported by other examples, where teachers made links which they hoped would make tasks relevant (4.1.1.2). The extent to which these teacher examples were effective remains a moot point given that not all the students would necessarily relate to tiling a garden path (the junior class example provided). However, it may have alerted them to other experiences which could provide their own context for the particular learning.

Formative assessment

Co-constructive pedagogy relies heavily on formative assessment strategies during learning. These are particularly those interactions that Bell and Cowie (2001) would label "interactive" where teachers "notice, recognise and respond" (as Tom's explanation of students making mistakes exemplifies), as well as those "planned" where teachers "elicit, interpret and act" (as in the questioning practices described, such as asking students to generate questions). Also students may initiate this dialogue. The dynamic, responsive and unpredictable atmosphere in the class seems attributable to the prevalence and valuing of such formative

interactions, as the teacher and students, or students and students engage in interchanges which give feedback and feed-forward on the learning. This practice of students teaching each other can be risky. Some teachers mentioned their concern that students may have inaccurate understandings of concepts and so affirm misconceptions. Similar concerns feature in existing literature (Good & Brophy, 2008; Sewell & St George, 2008).

Discourse patterns

Analyses of the traditional classroom have uncovered a predominant pattern of classroom talk, referred to as the "triadic dialogue". This is an Initiate-Response-Evaluation (I-R-E) pattern (Cormack, 1999, p. 2), with the teacher asking the question and students giving a response, which the teacher then appraises. Young (1991) explores the power relations that this discourse pattern represents, that is, that power resides mainly with the teacher.

In co-constructive classrooms, new discourse patterns emerge, such as teachers inviting students' questions and students initiating questions, as described in 4.1.1.2 of this study. This requires the teacher to listen much more, and provides more opportunities than previously for students to steer the lesson to areas they need further explanation about, or are interested in. Such control may be motivational (Boomer et al., 1992; Lauritzen & Jaegar, 2002), and research on integrated curriculum (Beane, 1997, 2005) describes examples of constructing curriculum units around students' questions.

The student spokesperson, described in 4.1.1.2, who asks questions that identify areas of student difficulty, features with variations in other literature. Sherin (2002) notes novel student comments rather than a question. Bell and Cowie (2001) similarly note students' actions or comments. The signal acts as a catalyst for teacher change in the planned content. Like the question in this study, "it was a signpost for the teacher to check on the progress of the lesson" (Sherin, 2002, p. 145). Such prompts have the teacher rethink their planned instructional procedure and offer opportunities for the teacher to learn more about particular content areas and pedagogical possibilities.

New pedagogies introduce innovations that contravene what might have been the status quo for students. This study provides examples of teacher explanation and reiteration to students of the acceptability and the reasoning behind the choice of practices, such as there being more than one way to find an acceptable answer; that students can teach; that making mistakes is important to learning (4.1.2.2). Rudduck and Flutter (2000) endorse such practices, explaining that teachers have PD of considerable duration to enable their change in practice, whereas such explanatory commentary and practice is seldom replicated for students. Such explanations can help reduce student resistance and non-cooperation.

Use of groups

The use of groups as the dominant classroom structuring for co-construction is widely recommended across research (Boomer, 1992c; Cook, 1992; Good & Brophy, 2008; Nuthall, 2002; Wells, 2002). Indeed, Nuthall (2002) using research from science and social studies teaching, states that once students can run their own groups well, these provide a better vehicle to achieve the constructivist aims of participation and reasoning, particularly if the context discussion is based on shared activities.

However, there are cautions to over-representing the pedagogy as only group-based. As noted in this study, co-construction can be with individuals, pairs, groups or a whole class. Such variation is important in fitting the pedagogy to the students, teacher circumstance and the content to be learnt. The range of collaborative learning techniques used included cooperative learning, jigsaw and other less structured arrangements. Lester (1992) warns that the use of cooperative groups is not necessarily co-construction, a message reiterated by Sam in this study.

It was of interest that for many of the mathematics teachers, the move to using groups was quite recent, particularly in senior classes. They often used hands-on type activities, which required student cooperation and occasionally competition. There are also cautions about group dynamics, which are well documented (Bennett & Dunne, 1992; Good & Brophy, 2008; Holton, Spicer, Thomas &

Young, 1996; Kutnich & Rogers, 1994, Thomas, 1994) and these need attention when putting a co-constructive pedagogy into practice.

Areas of potential

The descriptions of practices reveal certain aspects of the classroom curriculum as being relatively under-used for co-construction. The potential of widening teachers' conceptions of co-construction and giving greater importance to such areas can bring benefits to all participants. Apart from formal planning of content and method, the areas of the classroom curriculum identified were summative assessments, evaluation, reporting, and pastoral care. Such areas also feature infrequently in literature on co-construction. Kane and Maw (2005) describe the use of students' views to evaluate teaching programmes, while Mercado (2001) encourages the pastoral relationship: "What teachers know about the lives of children outside of school affects their pedagogical practices. Inquiry needs to become a common pedagogical practice" (p. 690).

Teacher Issues

Alton-Lee (2003) goes so far as to claim that "Quality teaching is a co-construction with students" (p. 8). Teaching should be responsive to the learners, their diversity and the variables of context. The following issues, which were perceived to impact on teachers' capacity to co-construct, are discussed here: school systems, habitual or tacit practices, and the changing teacher role.

School systems

That the mathematics teachers felt unable to plan their programmes or units with their students was an example of how the structures of secondary schooling can constrict change or innovation. Schooling has common routines and rituals across levels, locations and cultures, which are seldom questioned, and can restrict and shape the behaviour and thinking of the participants (Boomer, 1992c; Gore, 1998; Nuthall, 2001). What Tye (1989) calls "the deep structures" of the institution include the physical environment such as the size of rooms (which allow for seated activities only), the proximity of rooms (which means noise can impinge on other classes), the placement of whiteboards at the front of the class; systemic

familiarities such as curriculum subjects, the segregation of the day into evenly-timed segments indicated by a bell or siren, the movement of students between classes following a timetable, the streaming of students, and the uniformity of behaviour and dress. Such institutional strictures demonstrate a control orientation that regulates both students' and teachers' autonomy and agency. Indeed, Gatto (2005) argues the methods of massed schooling are the only content it teaches - the hidden curriculum. What students learn includes confusion, the hierarchies of class, indifference, emotional and intellectual dependency, provisional self-esteem and surveillance.

Conformity in curriculum and pedagogical practice is also the rule. Students are expected to learn the same things, so they are equally prepared for the qualifications that dominate not only Y11-13, but also the whole of the school (as the use of the terminology of NCEA standards-based assessment in Y9 classes illustrated). The accountability system often requires that heads of faculty develop timelines with tightly prescribed content that is tested across a year cohort. Gore's (1998) explanation of the power relations that control the actions of teachers and students in the school site finds traction in this workplace. She argues that teachers work to comply with deeply entrenched systemic patterns and expectations in a hierarchical power structure, using techniques of power themselves to regulate students such as surveillance, normalization, exclusion, distribution, and individualization.

However, not all subjects (e.g., art, social studies) had the same perceived restraints on planning with students despite the strictures of the school system, suggesting that pedagogical practice may be more strongly constrained by subject than school structures. Also, once they started to view their teaching as a co-construction, teachers were increasingly able to identify aspects of the curriculum that could be planned at least in part with students or other ways that they could co-construct.

Habitual practices

Becoming aware of the habitual co-constructive practices in their personal pedagogy was an area of learning for teachers. For example, many decisions

about how learning would proceed, such as seating, timing, choice of partners or groups were undertaken unconsciously in a co-constructive manner, yet were not identified as such. When such behaviour and the discourse that supported it were made visible, it was affirming for teachers and promoted the reclassification of many long-standing practices. The use of student choice was one area that exemplified this. Though only a minor aspect of co-construction, the new awareness seemed to help teachers by generating greater confidence, risk-taking and identifying further possibilities. For example, Joy tried a co-construction of content, and then method, with students for a revision unit "Because … I wanted to have a go … so that's good" (Joy, CO, 11/11, p. 1).

The idea of differentiation within a class is not usual in much secondary pedagogy, though there may be differentiation by streaming among a cohort. Indeed, Gatto (2005) argues the whole practice of streaming is teaching students compliance and knowing one's place. Such regularities, as seeing the class as one and keeping them moving through content at the same pace, are common (Bendikson, 1997). Co-construction foregrounds personal differences in learning and perception. However, against this individuality, other people (or the group) are needed by the learner to learn. That some teachers acknowledged this at revision time in their co-construction of content and processes might be leverage to them seeing students more individually at other times, a move towards personalisation of learning. (This is a recently politicised term with topical focus in the publication of Ministry of Education policy, *Let's Talk About: Personalising Learning* (2007a), with statements by the then Minister, Maharey). The concept is far from new as Dewey's writings reveal. However, articles in the PPTA news (e.g., Duff, 2007), along with comment from Renshaw (2007) about the relational nature of learning, alert us to some potential drawbacks of its current promotion. Duff (2007, p. 3) claimed that personalised learning is "hard to implement in a class of 20 and impossible in classes of 30 and above … in some large secondary schools about a third of class sizes have more than 30 kids". He argued the then government was not committed to providing the support needed for teachers to pursue personalised learning, such as reducing class sizes.

Another feature is the trust teachers must invest in students' ability to recognise accurately their learning issues. This is an area potentially fraught with difficulty. However, where both parties are willing to converse and be flexible, the outcome can be encouraging. The continuum where students self-selected the level of difficulty of work was a successful differentiation strategy.

Teacher's role

The changes in the teacher's role in co-construction arose frequently when discussing pedagogical practices. Uncertainty, conflict and discomfort over what the teacher should be doing to promote power-sharing practices were prevalent. Initially many teachers did not seem to conceptualise the interactions of co-construction as a consultation or negotiation, but rather as what Meighan (1988, p. 38) terms a "democratic curriculum" where "a group of learners write, implement and review their own curriculum, starting out with a blank piece of paper", or the more negatively framed *laissez faire* education. The importance of the teacher's overall professional responsibility for the classroom, and their role as part of the interaction ("I am part of it." Roy, II p. 26), which endorses that they have valid ideas, expertise about content and pedagogy, and positions to share in the co-construction, and that they are usually the final arbiter of what would happen, was sometimes usurped by ideas that the teacher should accept whatever the students wanted. ("I was down the aisle of that the kids had to make the decisions and … that we all learnt from the students." Joy, FI, p. 1.) The understanding of the relationship as being bidirectional, of meeting the needs of two parties, was submerged. Palmer's (1998) explanation of paradox where apparent opposites are held in tension in order to make sense of what seems to be contradictory, opens another pathway through this tendency of the teachers to view the situation in a binary fashion.

Such ambivalence features in other studies. Nieto (1994, p. 398) cautions seeing students' ideas as the "final and conclusive word". Boomer (1992a) also makes a useful clarification:

> It is not suggested that the children decide on the curriculum. Constraints and non-negotiable demands must be spelled out by the teacher. The teacher must exercise professional judgment in the

> selection of content and goals and in the organization of appropriate learning activities. After consultation and explanation, the teacher has the responsibility of drawing up a structured programme of work that will be binding on all the children. The plan should, however, be subject to adjustment if it is not proving successful. (p. 40)

He provides a framework to scaffold the path to greater participation by students:

> Many factors (e.g. age, experience, accommodation, school policy) will influence the degree to which the teacher allows the class to make or suggest changes to the plans. If the class is new to the process of negotiation, the plans may simply be discussed but not altered, so that at least the children will know what is going to happen and what is expected of them. At the other extreme, where the class and teacher are quite accustomed to collaborating, the teacher's plan may be presented as only a tentative proposal, to be shaped into a tight program only after concerted consultation with the children. (1992a, p. 39)

This former practice would seem commonplace in this study from both the reports of teachers and students (e.g., the use of the "can do' sheet under summative assessment, 4.1.1.3). Unfortunately, the strictures of their context meant teachers did not achieve the latter, though there were steps made by some to develop the detail of part of a unit, and by most to consult students about aspects of the detail of a lesson.

Findings from the curriculum development movement of the 1970s showed the importance of explaining the reasoning behind any changes in classroom content and pedagogy to students to alleviate their resistance: "An alternative to imposed change through the authority of the teacher is to explore the need for change with pupils … 'a communal venturing forth'; the discussion of purpose … was a precondition of working effectively together" (Rudduck & Flutter, 2000, p. 84). Most of the teachers followed such practices as they sought to change the nature of the learning interactions in their classroom, for example, by explaining why students should ask each other first if they do not understand.

The practices identified by the teachers led to some quite marked changes in some of their behaviour in the classroom. In addition to talking in instruction mode at

the front of the class they introduced an increasing range of interactions. These included encouraging different patterns of classroom discourse such as: inviting student input, listening to student interactions and questions, circulating around groups and listening and questioning, sometimes negotiating rather than telling, making decisions of what to do next based on what they learn about students' understandings during a lesson; and taking risks by moving outside the ways they had taught in the past. The teachers varied in the extent and depth of the changes in their practice. All, however, while acknowledging constraints (see Chapter 5: 5.3), professed acceptance and understanding of co-constructive ideas and wished to sustain their implementation.

Nuthall (2002) identifies aspects of the teacher's role in social constructivist teaching of a whole class as constant monitoring of student interactions and their content, close listening, requiring that students provide evidence or explanation to support their views, and not providing a solution when it is within the students' capabilities to work it out themselves. These actions are all replicated in this study (see 4.1.1.2).

Students' viewpoints

The range of practices students identified as allowing them input into the classroom curriculum was broad, perceptive, and aligned well with the perspectives of teachers. For example, being involved in planning of programmes and units was seldom recollected by students, and teachers rarely did this (4.1.1.1). Across the students involved, there was a diverse and illuminating awareness of teaching and learning practices across subject areas. They were able to discriminate between what they felt were helpful and unhelpful practices. For example, work in groups was generally viewed positively as assisting their learning (4.1.2.2); a view their teachers shared.

Students were able to describe certain pedagogical strategies in detail, such as the rally table to access prior learning; and recognised their input and choice into the specifics of a task (4.1.1.2). They were also very aware of the intricacies of their classroom interactions with teachers, and could recall word for word, action by

action, the discourse patterns that characterized certain types of classroom situations where they were consulted or had opportunities to have input (4.1.1.2; 4.1.1.3). They were also cognisant of their involvement in the development of the classroom environment through the code of conduct, seating choices, and keeping the teacher informed about external activities which might compromise their performance (4.1.2.1). During learning, some students noted their agency in suggesting activities, breaks, the type of pedagogy that suited their needs, in gaining individual instruction, choice of recording method, and in pacing the amount and speed of work done (4.1.2.2). They identified time allowance as an important area of negotiation.

Being told what to do and how to do it, still describes quite aptly a considerable proportion of many students' experience and expectations of the classroom curriculum (4.1.1.2) (Bishop, Berryman, Cavanagh et al., 2007; Rudduck & Flutter, 2000). This view underestimates the learner and overlooks their real needs and concerns. The teacher in such instances is working from assumptions of the perceived needs of the students, rather than their actual needs. In attempting co-construction, teachers were trying to move away from these suppositions to views based on consultation and interaction with students.

Bishop et al. (2003, p. 201) endorse co-construction as part of a culturally-responsive pedagogy, that "promote[s] power-sharing interactions between teachers and students, students and students and teachers/students and those parenting the child, so that learners can initiate interactions beyond seeking instruction or compliance." This study showed students moving some distance beyond seeking instruction and compliance, into interactions with teachers that involved decisions about aspects of content development; teaching; determination of the learning process, timing and environment; evaluation of units and programmes; and involvement in reporting. All these involve a marked change in the traditional distribution of power in the classroom. At least two classes in the study were for Māori students only. One of these in particular provided numerous examples of co-construction.

An area of rapid growth in educational research, particularly in the UK, is taking into account students' views of teaching and learning, a previously neglected aspect (Arnot, McIntyre, Pedder & Reay, 2004; Cooper & McIntyre, 1996; Kane & Maw, 2005; McIntyre et al., 2005). Fielding (2004b, p. 308) argues that "the traditional roles of teacher and student [are beginning to] become much less firmly fixed, much more malleable, much more explicitly and joyfully interdependent." This study provides material that supports such a claim to some degree. Students identified many aspects of their role, which might have been attributed to the teacher in a traditional classroom. They had input into decisions about many aspects of their classroom curriculum, though in comparison with that conceptualised by Apple and Beane (1999), Bishop and Glynn (1999), Beane (1997), Hargreaves et al. (2001), and Hyde (1992a), these might seem superficial. The students' classroom experience was beginning to change, moving closer to the Māori concept of *ako* which describes a more reciprocal relationship between learner and teacher (Bishop & Glynn, 1999).

It would be foolhardy to claim that the teachers and students in these classrooms demonstrated the zenith of co-constructive practices. However, all teachers developed to varying degrees over the duration of the study in their incorporation of aspects of this practice into their classes. This related to risk, confidence and external considerations, such as the timing of a cohort wide summative test. The classroom programmes were robust, providing stimulation, and in my view, ample intellectual challenge for the students.

Students seemed involved and engaged in their lessons. However, rather than superimpose our standards about the quality of the aspects they co-constructed, it might be sensible to listen to their evaluation of their areas of input. Our denotation of negotiation of time, and choice of seating as superficial, may not relate to students' priorities. Also, many students valued the provision of choice, though Grundy (1987) deemed this token or contract learning. Many of the choices students had were valid: real choices which required the teacher to be flexible to accommodate them. Many of the strategies which involved students required concerted effort and thought on their part, such as when developing

programmes and teaching ideas to other students, or creating examples for their peers to work on. Teachers were highly interested in students' evaluations. They heeded their viewpoints carefully weighing up how they might respond.

The idea of contrivance needs deconstructing. It was common for teachers to claim that if students suggested ideas that were close to their own either for content or the learning process that it seemed "contrived". It was as though a teacher could not have any sensible ideas of what should be learned or how it might proceed. This negation of the teacher as contributor was worrying. The whole point is that this process is transactive, and must include the needs, intentions, responsibilities and interest of *both* teachers and students - not just the students, or the teacher. The teacher is not a mere cipher, but neither should students' viewpoints be sought and then ignored. There needs to be dialogue to explain the decisions, conclusions made, perhaps through consensus, or by teacher explanation of actual constraints- resources, time, prescription, and so forth. There was still confusion for certain teachers as to their role in co-construction.

This section has discussed important issues that arose from the findings about the practices that characterize co-construction, from the viewpoints of both teachers and students. The gradual melding of teacher and student roles, and resultant flexibility of a co-constructive pedagogy, which can be utilised widely across most aspects of a classroom's curriculum were evident. The next chapter reports the constraints for teachers and students to developing such pedagogy more extensively and rapidly, and the opportunities the pedagogy provides which mean perseverance is worthwhile.

Chapter Five

Findings and Discussion: Constraints and Opportunities

Introduction

This chapter continues the findings, followed by discussion. It covers the remaining four themes that emerged from the findings, which detail the difficulties and satisfactions that might be encountered when attempting to co-construct. Those aspects that impeded the development of co-construction in the classroom to some extent are described: the suitability of subjects to co-construction, teachers' evolving understanding of co-construction, and potential constraints. The reasons for persevering follow.

The topics are sequenced with some chronological relationship to when they emerged over the stages of the research. For example, the initial theme of subject suitability which follows, emerged with some force for many teacher participants early in the study, but had dissipated largely by Stage Three.

5.1 Suitability of subjects to co-construction

5.1.1 Findings

In the early stages of data collection, it became apparent that teacher participants were concerned with the suitability of co-construction as a pedagogical approach in all subject disciplines. The concept of co-construction of the classroom curriculum is presented as applicable to any classroom (Boomer et al., 1992). There is, however, the possibility that co-construction is affected by the nature of particular subjects. There may be differences between subject disciplines in their suitability for co-construction related to the particular nature of subjects rather than an individual teacher's pedagogy. Indeed, both students and teachers offered viewpoints about this. They were grouped into the perceptions of teachers and students of variations between subject areas, the particular case of mathematics and pedagogical issues related to co-construction in mathematics.

5.1.1.1 Subject variations

During the initial interviews most of the teachers suggested that there were variations between school subjects in the ease with which co-construction could be implemented. Transferring generic ideas of practice to a particular subject area could be difficult. In particular, achieving this in mathematics was described as challenging:

> I'd love to see some maths lessons or something like that, or see some lesson plans of how it can be applied in maths. Because that's always been quite hard … I know [our HOD] is always going on about … maths not necessarily taking in some of these ideas as easily as some of the other subjects might, and that's always been my struggle too … you hear a lot of good stuff, and then when I try and think about how I'm going to put it into my classroom, I struggle, I just sort of think "Oh what can I do here? How am I going to do it?" (Rae, II, p. 14)

Some teachers made evaluations about the appropriateness of co-construction to particular subject areas based on their experience of and confidence in teaching a range of subjects:

> I've taught social studies and economics in my time … and there are so many things you can do - group type activities and they can decide that they don't want to do [this part of] Germany, generally they can do some other part of Germany … I mean there's a hundred different things and so I am quite envious that it's just a lot easier to actually do the whole project. (Joy, II, p. 20)

> Try and work out what their knowledge is, that should lead to obviously where the class needs to go to, to either continue with that knowledge, if it's good, or to try and modify that knowledge, if it isn't good, and … I can understand that a lot in the science area, and feel a little bit more uncomfortable with it in the maths area. (Sam, II, p. 2)

Students also had views about subject variations. Early in the Stage One during a student group interview, a junior student suggested that the potential for students' input into the classroom curriculum can vary depending upon the nature of the subject, quite apart from any variation attributable to teachers: "The different subjects make a difference" (Raess, 27/6, p. 6).

These students put forward their perception of a subject hierarchy or continuum of possibility for student input across subjects. I pursued this idea subsequently with other students and found consistent views. The juniors identified social studies as a subject that permitted a lot of student input: "The learning's better. The kind of subjects we are learning…. We have the input of say about the subjects [topics] and things" (Raess, 27/6, p. 6).

Physical education, Māori, health, English and technology were also identified commonly by the junior students as permitting greater input from them than, for example, mathematics, which was "one of the strictest" subjects (Joyss, 11/11, p. 4). (The details of the types of input they described are explained in the previous chapter.) One criterion used to support their judgments and discriminate between subjects by both senior and junior students was the potential in a subject to debate, discuss, or offer one's opinions. Some teachers agreed: "for some reason you naturally think of it in social type areas where discussions are held … so that's why social studies … they would take to it like a duck to water" (Roy, II, p. 43).

The senior students I spoke to (who were not spread across all subject areas), made a distinction about student input between the sciences (chemistry, biology), economics and mathematics, subjects they described as "it's either yes, no, right, wrong" (Royss, 26/6, p. 9), and the others: art history, English, PE, art, and history, the "English-based subjects" (Jackss, 6/11, p. 6). One senior student explained this disparity as between "thinking subjects", those that require creativity, such as English, media studies and drama, and those where you need to remember and apply information such as statistics (Mary, 19/3, p. 14). Certain subjects, such as art and history, were described as "wide open" (Royss, 26/6, p. 9); English was also perceived as very flexible (Samss, 4/11, p. 5).

Another point of difference suggested by senior students was that their input was greatest in subjects that they thought suited group work, for example, English, history, health, media studies, and drama (Mary, 19/3, p. 3). However, other students, in contrast, felt that their subjects, such as tourism and photography,

which featured independent, self-paced learning, elicited much student input as well (Alice & Eve, 19/3, p. 3).

It was not possible to support these perceptions with data from classroom observations as I observed only art history and mathematics classes. Therefore, it was not possible to describe or make comparisons about any variation in input that students had across their subjects. However, as illustrated in Chapter 4, the observations and interviews provide examples of co-construction occurring in mathematics for these senior students. Indeed, one student recalled a former mathematics class as being where she had had the most input to her learning that she could remember (Pam, 19/3, p. 11).

5.1.1.2 The case of mathematics

To co-construct in mathematics was viewed as problematic by some of the teachers and most of the students. Their explanations identified several similar aspects of the subject and current mathematics pedagogy as contributing to this situation. Several teachers saw much of mathematics as abstract and not easily linked to daily life, which limited meaningful co-construction of content with students: "… it just worries me that ninety percent of the curriculum has nothing to do with everyday life" (Joy, 6/11, p. 4).

> I believe we need to change the way we teach maths, … we currently teach a lot of tools, and it feels like we're just throwing tools out and I think, yes, if we change it around so that we can turn it into what maths should be which is looking at the real world and somehow manipulating the real world and therefore learning those tools we need, then I can understand how to co-construct - maybe. (Sam, II, p. 2)

In addition, teachers thought that mathematics has rigorous concepts and procedures: "… the way you set questions out and the workings are so important … whereas I don't know if some of the other subjects were as strict as that" (Rae, II, p. 8). A student illustrated this view and the previous issue with a comparison of mathematics and photography:

> I think that would be difficult for maths just because it's maths.… Because you've got heaps of formulas and new concepts and ideas that you haven't really heard before and it needs a lot of clarification, whereas photography it's all your opinion and ideas. I mean, you've seen photographs and movies your whole life … so when you talk about lighting or where the lighting is coming from, it's easier to understand because you can see it, whereas maths, you just have to take their word for it that that's the formula. (Eve, 19/3, p. 4)

Classroom observations gave limited support to these ideas. I did not observe any senior calculus lessons in Stage One which were expected to provide a "huge problem" to relate to real life (Jack, 2/7, p. 1). However, in the Y13 statistics class (Jack, CO, 2/7), the teacher made every effort to make connections, relevant links to society, and provide practical applications of the ideas students were working with, even linking to other subjects. For example, he asked a student to explain some biology research she had done, which compared the size of leaves between the dark and light sides of a tree, to illustrate the difference between two means. Random samples and margin of error were other concepts referred back to a context that students were familiar with or provided themselves. In the majority of junior classrooms observed in Stage One, it was common for teachers and students to be working for at least some part of the lesson on problems or examples that were contextualized or based on the students' own suggestions. For example, milk containers were used to work on surface area and volume (Tom, CO, 25/6), students developed their own question on which to gather data from other class members for a graphing project (Joan, CO, 18/6, p. 5), and a teacher set a task to generate data for a pie graph based on how the class (9W) travelled to school (Joy, CO, 17/6, p. 2). I observed only two Y13 calculus classes in Stage Two and in these links to daily life were not frequent.

Early in Stage One, junior students described mathematics as being quite different from other subjects, in that it introduces a lot of new ideas and knowledge daily, which made learning and retention more difficult:

> S. Like everyday like we change our subject [topic], like could be this graph, next day that graph in your book, that graph and the next day it's that graph in your book, not that one and you've just forgot them all.
>
> S. You forgot them all, she expects us to know them all.
>
> S. Yeah, but we can't do it because we do too much and we change subjects every, like every day. We learnt them for two days and then change.
>
> S. Like with the bar graphs.
>
> S. For one day, not even one day, and half a period and then change. (Raess, 27/6, p. 9)

These students' explanations of the seemingly fast pacing of the introduction of new ideas in mathematics in comparison with other subjects, was reiterated by a senior student (Jackss, 6/11, p. 7), and did hit a chord with another teacher (Sam, 27/6, p. 6). When their perspective was shared with the teacher, her response was to concur:

> Everyday there's something new.... You don't get much of a chance to consolidate what you learned the last time. You sort of just get to learn it and then you've got to move on.... That is so true, the kids are just, you know, they're just catching on to something ... or they haven't even quite caught on, they have to move on. (Rae, 27/6, p. 7)

Because the schedule of observations of the mathematics classes was not over consecutive days, I am not able to verify this with observational data. Clearly, new concepts or bits of knowledge were introduced in many lessons observed, as well as concepts being reviewed. It was evident that teachers took care to structure content and build on previous knowledge. For example, situations observed included students being asked to come up with all that they knew about the stages of a statistical process (Joan, CO, 18/6, p. 1), or about measurement of a container (Tom, CO, 19/6, p. 5), or a circular shape (Sam, 27/6, p. 4). Each lesson seemed to build on the previous one with a minimum of time overlap. One example which helps explain this, was when a teacher who had been absent from two previous lessons with his class carefully checked with them what they had done and learnt with the reliever before feeling able to decide how to continue (Tom, 25/6, pp. 1 & 3). "I prefer that they tell me. I needed to know, so I knew where we were

headed and how much I had to go back and recap on". He described this preoccupation with steady, cumulative, daily learning with the teacher closely in touch with where students are at in their learning, as resulting in a focus on the "lesson" (Tom, II, p. 15).

5.1.1.3 Pedagogical concerns

There were some pedagogical issues about which many students and some teachers were in accord. They included reliance on textbooks and the teacher. Several teachers noted a strong tradition of textbook pedagogy in mathematics (Sam, II, p. 22; Kate, FI, p. 5): "you worked through from beginning to end … I still use textbooks a lot" (Joy, II, p. 19). In addition, some junior students mentioned their dislike of texts during our interviews.

However, this supposed reliance on textbooks was not borne out during the lessons that I observed in the junior classes. During Stage One, textbooks were only used for a small part of any lesson, if at all, and then only to provide a few more examples on a topic after the students had explored ideas in a variety of ways. A good proportion of each lesson was spent reviewing concepts or developing new ones using teacher-generated examples on the whiteboard, group activities or puzzles, materials or models, or having students make up their own examples to give to each other. One teacher explained a preference to move away from the textbook:

> I envisaged the lesson being a bit more textbook orientated … I thought well why? Let's give them the actual equipment … I was going to get them just to do a whole bunch of text book exercises just to reinforce what I was talking about, but then I thought well, no, I'll do it better, I'll get them to…. (Tom, 25/6, p. 5)

The few senior classes I observed did use textbooks to supply examples.

For students, dependence on the teacher was related to the perceived inherent difficulty of the subject, and the seemingly unrelated nature of senior branches of the subject to previous learning:

> I think the maths one and like economics and accounting and those subjects, you really need the teacher to be really knowledgeable on the subject and teach you, because those kind of things are so hard, you just need to be told how to do it and go through lots of examples and stuff. (Jackss, 6/11, p. 6)

> S: It's sort of hard to have input because we don't know what we're doing…. Statistics is like a whole new subject. Haven't done it before….
>
> S: It's like totally new terms.
>
> S: A different language, you know, blah blah blah. I think that once we grasp the basics it will be easier to do group learning. (Alice & Eve, 19/3, p. 13)

Whereas for at least one of the teachers the relationships between various branches of mathematics would seem to prescribe a set sequencing which students, because of their limited overview of the subject, would not know:

> Because if they don't know what there is to learn, they don't know which order to do it in. And I think when you need to know algebra … need to have done number first before you get onto algebra. If you've done algebra, before you do trig…. (Joy, 11/11, p. 8)

Another suggested prerequisite for co-construction was having chances for discussion, and here some of the students considered mathematics was inflexible: "I mean maths's maths … and it's hard to have an input, to have an opinion, you just don't know…. And you can't really discuss things in maths because that's the formula, that's the way you do it" (Jackss, 6/11, p. 7). Some of the teachers held similar viewpoints, as one explained:

> I just think perhaps other subjects may lend themselves more easily to co-construction because like where there are opportunities for discussion or, I don't know, I just think that sometimes maths is quite constrained and not necessarily as easy to trial things as some of the other subjects maybe … I don't know. I imagine English and the social sciences would have a lot more scope for using co-construction than we would have. (Rae, II, p. 8)

Observations did not corroborate the concern about a lack of opportunity for discussion in mathematics classes. All five junior classes observed in Stage One

sat in small groups usually of up to four students, and teachers used these groupings in a variety of ways to promote interactions between students about tasks. For example, they often asked students to work together to solve problems, to complete puzzles or activities, to develop ideas and questions, to assist each other, or to provide answers.

Teachers added further concerns of their own in regard to co-construction of content. Mathematics did not seem to offer as much scope as other subjects because of its character, as one teacher suggested: "I think we would have less ability to plan our curriculum around what our kids say they want to learn" (Sam, 27/6, p. 9). And another, "whether it's just that the subject is limited in how far they can actually think ahead" (Joan, II, p. 9). Other teachers attempted to clarify the constraints that they perceived:

> Usually, you've given an outline to students of what this next topic is about, and always with mathematics, being a spiral subject, students often haven't got that depth of knowledge to know where in fact that's possibly going to lead them to, until they've done the topic and it's only when they're partway through the topic that they start to see different directions that it's possible to be able to be taken. And then we've got the constraints of how far outside of the prescription can you go to chase that interest that the students are showing. So that's always going to be a problem.… (Jack, II, p. 6)

> I think with maths especially with the abstract topics, for them to be able to think forward to see where algebra could take them, and why does that happen, that's where I think we have the difficulty …. Something like algebra, which is so abstract, I find it's very difficult for a student to be able to work out what they want to find out. (Joan, II, p. 8)

However, students' involvement in planning and contributing ideas was envisaged as achievable in certain topics of the mathematics curriculum by some teachers: "But there are some topics like measurement where … there might be some questions like, 'What is it you want to find out?'" (Joan, II, p. 8). This idea was developed by referring to part of the prescription in senior mathematics which might be suitable, and by the suggestion of adopting a thematic approach:

> And that co-construction can happen, particularly with that 20 per cent part of the 7th form mathematics with statistics where they have to produce a project of statistical quality. And often it takes them outside the prescription which they are learning within, because they start to see what else can I do with this data, so sometimes you can take them a little bit further than where they are. (Jack, II, p. 5)

> If we went into maths teaching of themes, a thematic approach, which some schools have tried … it might possibly be easier to be student-driven, because then you can try and pick a theme that they actually come up with, and then try and explore that in terms of their avenues…. (Joan, II, p. 22)

This idea of some topics within mathematics being more amenable to the co-construction of content arose again in Stage Two for two other teachers: "I'm sure I could probably do something differently with that particular topic on patterns … I didn't actually think about planning co-constructive activities into that particular lesson" (Rae, 12/9, p. 2). Resources and intimate knowledge of the curriculum by the teacher were recognised as helpful to co-constructing topics:

> It was statistics, probability and measurement and graphs … I think every topic … especially with the third and fourth form, could lend itself really well to it, because some are better than others, I must admit, but they all have times when you can certainly do it. Cause there's so much neat hands-on stuff that we've got here now.
>
> *So what makes it easier is that you have got lots of resources. What else helps?*
>
> Mainly the resources, the fact that I know the curriculum inside out, back to front, upside down so now I can…. (Joy, 12/9, p. 7)

It seemed that their participation in the research heightened their consciousness of wanting to co-construct, as during Stage One I had several of the teachers ask if they could have a list of strategies to consult to assist their trialling and implementation of more co-construction. As part of our first meeting as a group, the mathematics department brainstormed a list of strategies that could be used to assist co-construction across aspects of the classroom curriculum. The list we generated is found in Appendix M.

Although in Stage One many concerns were expressed, in Stage Two teachers made only occasional mention of mathematics' suitability for co-construction. These views mainly reflected personal concerns such as the relevance of the curriculum: "it's a curriculum that they can't see why they're learning something and the only reason they're learning it is as a stepping stone to varsity calculus" (Joy, 6/11, p. 3), or difficulties in transferring ideas to a mathematical context (Rae, 12/9, p. 5; 21/10, p. 9). During this time teachers developed personal understandings and repertoires of strategies which assisted them to co-construct to a greater degree (or in more aspects of the classroom curriculum) than previously. As their understandings of what co-construction could be developed (see 5.2.1.2), the focus moved from what they felt they were unable, constrained or did not want to co-construct in mathematics, to what the possibilities were in their current context. Different understandings were discussed and occasionally I could challenge views or misconceptions (Rae, 12/9, pp. 4-6).

By Stage Three the perceived unsuitability of mathematics as a subject for co-construction did not feature strongly in teachers' preoccupations. One teacher continued to challenge the relevance of the current national curriculum and views of pedagogy, and the constraints and sequencing of their school's programme (Joy, FI, p. 15). Another expressed the need for more research into co-construction in mathematics: "what's been trialled and what works well" (Rae, FI, p. 23). The apparent restrictiveness of mathematics in comparison with other subjects such as English in being able to preplan topics and sequence with students, was however still an issue for one teacher:

> I think I'm happier on the bigger scale to use the idea of an English class where, okay, we've got three novels to do. We've got a novel to do – here are three choices that I think would fit. Which one do you think would suit you as a class? ... And/or, "Look this year we've got to do a novel, poetry, you know, and blah, blah, blah. Which one would you want to do in which order?" sort of thing … But in maths I do feel a little bit more restricted in that sort of level of co-construction. (Sam, FI, p. 5)

Somewhat surprisingly, the list of potential strategies that we had created had been seldom used by any of the teachers when I asked about its usefulness in the final interview.

The theme of subject suitability, which was a major concern for many teachers at the outset of the study, had largely abated for most by Stage Three. The following section discusses some important issues this theme raises.

5.1.2 Discussion: Subject suitability

This section examines several major points that are raised by the preceding report of how the suitability of co-construction as pedagogy for all subject areas was perceived by both teachers and students. The issues that will be discussed in relation to the findings are the impact of distinctive subject disciplines on pedagogy, and the particular case of mathematics.

Distinctive disciplines

Over many centuries human knowledge has been organised into subject disciplines. Thus, there is a strong tradition of unique subject disciplines and their distinctive "moves, genres, syntax and content" and performances to demonstrate understanding (Gardner, 2004, pp. 233-234). The message that *Te Kōtahitanga* PD gave to participants, and that I continued in the *hui* workshop, was that the components that make up the theory of co-construction are interdisciplinary, applicable to any learning area. The assumption that co-construction can work across subject areas as varied as "within a geography topic, making a chair, understanding a poem, or unravelling a conundrum in science…." (Cook, 1992, p. 30), exemplifies its presumed universality. The discomfort expressed by some teachers in trying to apply co-construction to teaching their subject would, however, seem to endorse to some degree the view of the distinctiveness of the disciplines (Brophy, 2001c; Gardner, 2004; Shulman, 1987).

Shulman (1987) advanced the importance of the discipline perspective in teacher education by identifying a teacher's subject content knowledge and pedagogical content knowledge as important factors in effective teaching. This would suggest that generic understandings need rejigging to fit the unique form of a particular subject (Alton-Lee, 2003; Brophy, 2001b; Codd et. al., 2002; Shulman & Sherin, 2004). "Content is inextricably tied to form, and so content will direct what form develops or is eventually chosen" (Lester, 1992, p. 209). For example, activities

such as expert groups or jigsaw may fit some subjects and topics within the same, better than others. The effort to develop classrooms that facilitate co-construction can require some teachers to question the adequacy of their current pedagogical content knowledge. Also, when co-construction is being explained to an audience of teachers, emphasis should be placed on the potential need to adapt any strategies used to implement the approach in particular disciplines.

Both students and teachers expressed their experience of the variation between the disciplines. The continuum of possibility for student input suggested by students (see 5.1.1.1) was the most obvious example of their understanding of how subjects are distinctive. The congruence between student opinion across levels was marked, as was its alignment with teacher opinion. A humanities/mathematics-science divide emerged from their experience in classrooms. This viewpoint finds support from Mintrop (2004) who suggests that compared to other subjects, the traditions of social studies should provide plenty of scope for constructivist pedagogy. Further support of this perceived difference comes from Shulman and Sherin (2004, p. 138), who note that "the unique characteristics of mathematics as a discipline stand in stark contrast to social studies." In the case of the students in this study there was agreement that the nature of the subject curtails the range of pedagogical possibilities, and it was mathematics and scientific subjects that were identified as especially restrictive.

Students' views of the difference in subjects parallel those reported in research by Stodolsky, Salk and Glaessener (1991). They compared students' views of social studies and mathematics, and uncovered a different pattern of classroom instruction between the two disciplines. Over years of instruction, students develop views about the nature of knowledge in a subject area. Students in both studies characterize mathematics learning similarly, with "reliance on the teacher, a right wrong view of knowledge … with certainty; knowing it, with being able to get the right answer quickly" (Lampert, 1990, p. 32). This aligns with what Ernest identified as the Platonist view of mathematics: "a set of monoliths and immutable structures and truths, and a static but unified body of expert knowledge" (Barkatas & Malone, 2002, p. 115).

What might seem particularly ironic is that there is a comprehensive body of research and philosophical literature on mathematics and science learning and teaching, published in New Zealand and worldwide over the last two decades, which promulgates constructivist epistemology and promotes pedagogies to achieve this (Anthony & Walshaw, 2007; Begg, 1993; Carr & Ritchie, 1994; Cobb, 1994; Cobb & Bauersfeld, 1995; Davidson, 1990; Davis, Maher & Noddings, 1990; Fernandez, 1994; Good & Brophy, 2008; Hyde, 1992a; Malone & Taylor, 1993; Masters & Doig, 1994; Stein, 2001; Stephens, Waywood, Clarke & Izard, 1993; Walshaw, 1996). Indeed, one of the most widely replicated versions of social constructivist pedagogy, communities of learners, was originally designed for science classes (Brown & Campione, 1996). Also, in New Zealand, the mathematics and science learning areas of the *Curriculum Framework* were greatly influenced by constructivist theories (Clark, 1996/7; Neyland, 1995). Good and Brophy (2008) also claim that social constructivist approaches are more feasible for mathematics given its preponderance of procedural knowledge. However, it would seem that most of the students interviewed had had quite limited experience of such pedagogy in these subjects over their time in schools. Further, many of the teachers seem to have had either limited exposure to such ideas in their professional development to this point in time, or perhaps despite the best efforts of teacher educators (for those having their teacher education post-1990) subsequently conformed to the traditional practice in schools. As Klein (2001) has found, the task of inducting student teachers into constructivist pedagogy in mathematics can be problematic.

Another perspective to consider when judging whether pedagogical approaches have to be relatively traditional in mathematics and science (as the students and some of the teachers were implying) is the underlying unpredictability and uniqueness of any teaching situation. Implicit in the idea of quality teaching is a presumption of flexibility (Brophy, 2001b). Eisner (2000, p. 354) reminds us that teaching is a practical activity and requires "an extraordinary sensitivity to context." For the teacher this includes the subject content, the intended learning outcomes, the distinctiveness of the particular children, their prior learning, and numerous other situational factors such as time, facilities and activities. And what

happens is not only under the jurisdiction of the teacher: students too have considerable influence. They can comply or obstruct and resist what the teacher hopes to achieve. Sosniak (1999) points out the folly of extrapolating a more and more specific pedagogical content knowledge within a discipline given the potentially infinite combinations that constitute teaching.

Mathematics: restricted by the discipline or pedagogical tradition?

Mathematics teachers in particular, faced issues with co-construction. Sherin et al. (2004, p. 207) describe it as "a discipline apart" in their comparison of the implementation of a specific model of constructivist pedagogy across subject areas. Students and some teachers in this study promoted opportunities for discussion and group work as fundamental structures for co-construction, and mathematics was thought to not lend itself particularly well to these. They identified further constraints characteristic of traditional mathematics pedagogy, such as reliance on the teacher and textbooks. However, although reservations about the use of groups in mathematics are expressed by Stein (2001, p. 139) because they can "avoid issues of content", much literature about adopting a constructivist pedagogy in mathematics endorses as critical the use of discussion and collaborative group work (Anthony & Walshaw, 2007; Battista, 2001; Tobin & Imwold, 1993). Similarly, Green (1993) discounts the need for a textbook for effective constructivist teachers. Again it could be suggested that traditions of pedagogy were the barriers to change rather than a discipline being not suited to co-construction.

Mathematics classrooms, in comparison with other subjects, were perceived by several of the teachers and students to have a faster tempo. New concepts and ideas are introduced daily with there being little time to consolidate the learning. Although there is not a lot of literature that compares pedagogies across disciplines, Shulman and Sherin's (2004, p. 138) description of subject traditions suggests that mathematicians might think of "daily lessons, problem sets and homework reviews" which contrasts with the more long-term formats of units, projects and group work that might be the tradition of social studies teachers for example. In attempting to change aspects of their pedagogy to implement more

possibilities of co-construction, the lesson focus and pace might alter. However, when a teacher is habitually accessing students' prior learning and working with students from there, as was observed in many of the classes, the pacing might seem to be more leisurely and more engaging from the student's perspective (see sections 5.3 and 5.4 of this chapter for students' responses to co-construction).

Co-construction is played out in unique ways in each individual teacher's classroom even though they might be teaching the same subject. The understandings of both teachers and students about the nature of a subject and the traditions of pedagogy in a subject area can impact on the way that co-construction develops in a classroom. It affects perceptions of what the possibilities or potentialities are. There may also be a view amongst some of the mathematics teachers that the knowledge they teach is not open to questioning, (for example see Rae, II, p. 8, as quoted earlier in 5.1.1.2) and therefore must be taught in a set transmission style. Many of the characteristics of mathematics, which teachers and students identified as constraining the possibilities of co-construction, would not seem to be intrinsic aspects of the subject itself, but are enduring pedagogical traditions which need challenging. This was shown with the supposed reliance on textbooks, the lack of opportunities for learning-related discussion, the lack of linkage with real life, even involvement in planning of aspects of the content of the classroom curriculum. This difference between voiced perceptions and the reality revealed by observations of practice is a relatively common finding in research. The habitual nature of some aspects of classroom practice renders it unconscious to the player (Atkinson & Claxton, 2000; Knight, 2002). All of these initial concerns were dispelled at least in part for many of the participants in the course of classroom observations and the subsequent reflective interviews (see 5.1.1.2).

Co-construction of content initially brought concerns. Several teachers had the mindset that particular content and sequencing is essential and non-negotiable, and so that precludes student input. This perception reinforced teachers' view of how mathematics was potentially different from other subjects, and their discomfort with aspects of co-construction that seemed central to the *Te*

Kōtahitanga definition and the examples used in the *hui* workshop. In this I had used Cook's (1992) four questions (see 2.2.2, p. 32), where subject content and sequence are presented as important parts of the classroom curriculum to develop with students. It also linked with the classroom observations in Stage One, where I was grappling to make sense of what I observed in the mathematics classes in light of my own understandings of co-construction at that time (see the following theme on evolving understandings of co-construction). Planned, structured consultation with students to inform teacher long-term planning was almost non-existent, yet students were involved in very immediate ways with contributing to and taking responsibility for the happenings each day in the classroom curriculum. It contrasted considerably with my observations of art history lessons where the classroom activities could be interpreted and slotted into the format suggested by Cook. Cook (1992) however, had already identified the link: "An approach for the planning and implementation of a curriculum unit or topic … may be equally useful for a single period or activity" (p. 30). Another way of considering the difficulty of co-construction of content would be to acknowledge that some content is a constraint, as it can be in senior classes with tight prescriptions for qualifications, and focus on co-constructing other aspects of the classroom curriculum.

This section has discussed important points that arose from the theme of the suitability of co-construction as pedagogical approach to all subject disciplines, and to mathematics in particular. Although both literature and this study's findings identify a distinctive experience is common for learners when comparing mathematics with other disciplines, it would seem that pedagogical traditions produce this rather than an inherent incompatibility of the discipline to co-construction. The difficulties teachers perceived initially were not substantiated to any significant degree by the observational data or other literature. The following section reports the second important theme of teachers' evolving understanding of co-construction.

5.2 Teachers' evolving understandings of co-construction

5.2.1 Findings

The way teachers' understandings of co-construction evolved over the duration of the study emerged as a major theme. Comments indicative of teachers' understandings are drawn from the initial interviews, classroom observations and reflections, plus the meetings and final interviews. They raise issues about teachers' beliefs, understandings, willingness to change, and how ideas are put into practice. The theme is organized into three sections: First, an explanation of teachers' initial understandings of co-construction with illustrating excerpts is presented. Second, details of confusions expressed by teachers while comparing classroom practice with the rhetoric are given. Third, clarifications of how definitions changed over the time of the study, and identification of new areas of consensus that emerged in teachers' understanding by the final interview and meeting are explained. This theme is important because it was evident throughout the study, is central to the original study questions, and was crucial in terms of teachers' grasp of co-construction and its implementation in classrooms.

5.2.1.1 Initial understandings

The initial understandings of co-construction explained in this section are those which emerged from the first interviews with teachers, which followed professional development in *Te Kōtahitanga* project, including my workshop on co-construction, but preceded any classroom observation and teacher reflection. The workshop seemed to have motivated the teachers to develop further their practice of co-construction (in that they wished to be involved in the study), perhaps through its focus on beliefs about roles of teacher and learner, the identification of benefits, and the samples shared by roleplaying of potential areas for co-construction, which may have challenged their current understandings. Although teachers could confidently espouse an understanding of co-construction at this time using the rhetoric of the project, qualifications were voiced by over half of them however, when trying to explain the reality of how to implement these concepts.

The main interpretation of co-construction put forward by all the teachers at the beginning of the study was a partnership with students. Co-construction involved teachers working *with* students, students having *input* into decisions about aspects of the classroom, such as the environment, curriculum, lesson content and methods: "Basically that we form a partnership between the teacher and the student to … decide … on how and what they want to learn" (Joy, II, p. 2). (Tom, II, p. 1). Other teachers concurred:

> Giving the students a chance to have a say in how they want things to be done or what, or how they might want to learn. I think it's just sort of sharing the learning, how the learning will take place. That's how I understand it. (Rae, II, p. 2)

> It's when you're planning a body of work … where you're asking usually for prior knowledge and what they want to know about something, and you're asking them for the input into how you go about that learning and what they do and how they present it and … so you guide it, but in actual fact they've got quite a bit of input into what is learnt and how it's learnt and you do that before you have the unit … or if you have the unit you then reconstruct the unit. (Roy, II, p. 7)

Power was an important concept in the rhetoric of teachers' explanations of co-construction. The relationship involved power-sharing between teacher and students, often expressed as "giving students a little more power", so that the class was not purely "teacher-directed or driven" (Rae, II, p.1). (Jack, II, p. 1). In several instances, it was explained as a movement *away* from a teacher-directed classroom and *away* from a transmission mode of delivery: "rather than being up the front and talking at the board" (Kate, II, p. 2). Two others reiterated:

> Instead of a classroom situation which is purely driven by the teacher, like a power base in the teacher, … the shift in the classroom is one where the teacher works with the students and the students have input into … all avenues, like the environment, as well as possibly the curriculum area. (Joan, II, p. 2)

> The power-sharing relationship about what students learn in association with their teacher, and it is the sharing of what it is the students feel they should be learning with the direction and support of the teacher. (Jack, II, p. 2)

However, two teachers appeared uncomfortable about the implications of the approach for their current classes in regard to control and time: "I want all the power" (Kate, II, p. 3). "Having enough time to let the students decide what they wanted to do was scary stuff" (Joy, II, p. 3).

Despite the espoused emphasis on partnership and power-sharing by most, over half the participants admitted some uncertainty about what co-construction was, qualifying their remarks with comments such as "if I'm on the right track" (Tom, II, p. 7); "in my limited view of co-construction" (Joan II, p. 15); "I don't really know enough about it" (Rae, II, p. 5); "I must admit even up until recently I was still a bit vague about it all, and yet probably was doing it, but without realising there was this label that could have gone on what I was doing" (Tom, II, p. 5).

One teacher foreshadowed what was to be a continuing issue for himself and some others by distinguishing between cooperative group work and co-construction, and noting that the former can be totally teacher-directed, and pondering what theories about learning differentiated the two (Sam, II, p. 5). (See 5.2.1.2.)

For the majority of the teachers their encounter with the term *co-construction* was reported to be recent, occurring over the last three years. It was a coinage that for several emanated from their PD with *Te Kōtahitanga* project where it featured as part of the observation tool (the definition is given in Chapter 3: 3.3.1, p. 81; see also appendix H), and some subsequent reading, or from working in this particular school. One participant noted that it was a key aspect of every PD of late and equated to "a more modern way of learning" (Jack, II, p. 4). Moreover, he volunteered "transformational teaching" as a synonym for co-construction (Jack, II, p. 2).

Most, however, recalled some similar concept from their pre-service teacher education. This recollection varied depending upon when they had trained as teachers, and their recall. Some remembered a named pedagogical model: "activity-based learning" (Jack, II, p. 4) and "interactive learning" (Tom, II, p. 3);

others noted activities a teacher might undertake: "group work, but it's a bit more than that" (Kate, II, p. 2); "the setting up process … generating rules in the classroom and all that, that type of activity was something I was taught, but I do not actually think it had a term at the time … lots of things that I feel sort of went under that umbrella" (Joan, II, p. 2); while yet another described it as aspects of a teacher's role: "a facilitator of the learning in the classroom, not so much the director" (Rae, II, p. 3).

Many noted a positive connotation to co-constructive ideas from teacher education, as one participant recalled: "this is the right way of doing things" (Joan, II, p. 2); or felt comfortable with the idea:

> Because that was how I was trained and so I am just sort of still nodding my head with yes, I have seen this all before and I agree with it. It's not like it's coming from a completely different stand point, saying to me this is something out of the blue, and this is what we think, because that is what I was taught…. (Joan, II, p. 18)

However, several noted that despite this familiarity, co-constructive ideas had not translated into a habitual aspect of their practice once out teaching because of the demands of the job:

> You sort of fall asleep after a while and unless it is ingrained in you … there is so much to do and so much to learn in all avenues … what it is you revert back to the easy, which is the comfort zone, which is what you're used to. (Joan, II, pp. 3-4)

A link and comparison with constructivism was identified by only one teacher, and his understanding covered only a small area of the potential scope for implementation encompassed in a co-constructive pedagogy:

> The constructivism … seemed to be purely that idea of find out their knowledge first, and then decide how you're going to modify it or carry it through, where this idea, co-construction, especially people talking about co-constructing the way you're going to find out if they have that knowledge by the end of it, the assessments, and co-constructing the actual curriculum … well that's … some way out there. (Sam, II, p. 3)

The teachers were specifically asked if curriculum documents were a source of information about co-construction. This was because the *Curriculum Framework* (MOE, 1993) and its supporting publications often provide suggestions about pedagogy, which have clear constructivist leanings (e.g., in English, technology [see Chapter 2: 2.2.1] and the mathematics statements, MOE, 1992; and *Developing Mathematics Programmes*, *Mathematical Processes,* MOE, 1997a). None of the teachers attributed their understandings to these sources.

Only two teachers (both of whom had been educated for the primary service) could identify co-construction as a major philosophy that had underpinned much of their teaching over numerous years. One explained it as being fundamentally to do with human relationships: "How I want to be treated" (Roy, II, p. 13). However, the labelling was different: it appeared that "student-centred tasks" and "open plan schools" (Tom, II, pp. 3-4), or student "ownership" (Roy, II, p. 7) were the terms used to cover a lot of what they would now call "co-construction".

Several of the teachers also identified a teacher's personality and intellectual comfort with co-constructive ideas, as factors to be considered in implementing co-construction. One stressed the teacher–student relationship as a factor of personality and how this can be an important force to be taken into account in students' learning:

> Teaching is a game about personality anyway, and I suppose learning is a game about personality too, and when personalities from both learner and teacher meet, then learning takes place … unless you build that relationship with the student then learning is not going to take place in the most efficient way. And we all know that we've chosen subjects along the way because we've worked with teachers who we are very comfortable with and get on with. (Jack, II, p. 14)

Another explained how teachers' personal traits such as a creative mind-set, using initiative, and being prepared to attempt new approaches, were fundamental to making co-construction work:

> I think you can make it work anywhere … it's a state of mind. It's being willing to be creative about it…. It's just about trying. Got to be willing to have a go. How can I bring this into these lessons?

> It's all about attitude and approach. I don't think it's about subject … it's about access to the information, or seeing modelling of how it can be done, that sort of thing. (Tom, II, p. 22)

Conversely, it was suggested that the absence of such traits might constrain co-construction (see 5.3.1.2).

In summary, the above descriptions were the understandings that teachers had of co-construction at the beginning of the present study. They tended to explain their ideas using generally worded, abstract notions such as "partnership", "power-sharing" and "student input". Over half of the participants noted some uncertainty about their understandings, and none felt the curriculum documents had influenced their thinking about co-construction. The following section will discuss some of the concerns that eventuated for some of the teachers as they tried to implement these ideas into their classroom practice.

5.2.1.2 Common concerns

Tensions arose for many of the teachers as they sought to clarify their own views of co-construction while attempting to incorporate it into, and recognise it in their classroom practice. This section draws from the three periods of classroom observations and reflections (Stages One to Three), and the final interview and meeting, a period of one year's duration.

Each lesson observation in Stage One (and in the subsequent Stages Two and Three) was followed by a guided reflective interview with the teachers. They were asked to identify examples of co-construction in their lesson, and highlight issues about what constitutes co-construction-in-action in the classroom. There was variation in views and practice between teachers, which brought into focus a degree of confusion for some of them about possible classroom practices, and specifically what co-construction meant. Teachers appeared to grapple with clarification of their understandings of co-construction and the logistics of putting it into practice, as they reflected on their lesson and sought to identify examples of it in practice. The uncertainty about what co-construction was kept surfacing by way of comments such as: "I still am in the dark a bit about the co-construction

stuff" (Rae, 27/6, p. 7); "I still don't know how to plan a co-constructive lesson" (Sam, 27/6, p. 9).

For three teachers (Sam, Rae, and Joy) a degree of uncertainty was still evident during Stage Two, at the end of Stage Two, and even at the conclusion of the study. They expressed their desire for further clarification in a range of ways:

- Requests to see co-construction being modelled in their subject area: "I still want to see someone put the theory into action so I can get a good idea of what exactly, or how you could do a really good co-constructed lesson in maths. I still am a bit airy fairy about what it is, I think" (Rae, 12/9, p. 5); "It's a pity you can't bottle best practice … and sell it to them" (Sam, FI, p. 3).

- Admission of restricted knowledge: "I'm limited by what I know, and at the moment I don't think that I know that much about co-construction" (Rae, 11/11, p. 6); "I've still got this airy-fairy idea of what it is" (Joy, FI, p. 14).

- Acknowledgment of difficulty in application: "I haven't yet worked out how to co-construct a course or a lesson" (Sam, 4/11, p. 3). "I don't even know if I've got any real tools that just sort of formally say, 'This is how I can do it'" (Sam, FI, p. 1). "I guess the frustration is that no one can hand me a book. This is a model way to work.… Yes, where's my manual?" (Sam, FI, p. 16).

- Continued wrestling with their views of essential ingredients: "Is it co-construction? … even though I sort of fob it off in my mind as being co-construction I don't actually know that technically it is, because the kids haven't really been given the choice" (Rae, FI, p. 9).

The above distinctive concerns that some of the teachers experienced in identifying co-constructive practices in their classroom, and clarifying their

understandings of it in Stage One, for particular individuals continued to some degree throughout the remainder of the study. The next sections elaborate these concerns, and how, in some instances, particular teachers resolved them. The following areas of concern that teachers identified are covered: the requirement to plan with students, the place of spontaneity, teacher control, the place of cooperative learning and other strategies, resources, and the use of contrasts to assist clarification.

Planning curriculum content

A question several teachers raised was whether co-construction required the planning of the content of the classroom curriculum with students prior to a unit of learning (see also 5.1.1.3. regarding the particular case of planning content in mathematics). If teachers defined co-construction as providing opportunities for students to have input into decisions about "what and how" they were going to learn, but could not identify an episode when they spent time with students working on this, they understandably expressed uncertainty about just what co-construction was and how to implement it. Three teachers in particular (Sam, Jack and Rae), described such confusion with some frequency. Unless they were actually planning with students in class, was there co-construction?

During Stage Two Sam explained "… initially a lot of people were talking about co-construction in curriculum with our students and we're saying I feel a bit iffy … for sure" (Sam, 17/9, p. 6). At this point he contrasted his former view of co-construction as a "formal" process with a set model of strategies and activities to implement, with his current "informal" description that was not so prescribed:

> We're not really seeing it as a formal process, that we're *cooperative learning*…. We know cooperatively learning because we've got certain things that we do and we've got certain activities. But this co-construction seems to be these very informal goings-on. (Sam, 17/9, p. 7)

He later used the adjectives "big" and "little" to contrast what he was able to co-construct, with what the possibilities could be, recognising the constraint of prescribed topics:

> Let's say we talk about 7th form [Y13]. We construct some of when we're going to do some parts, but even that, I tend to define that. Our time lines are on the wall before we even start the year, so I don't do any of the big things, I just do the little things in the classroom. (Sam, 4/11, p. 3)

Spontaneity during the lesson

One teacher posed the question of whether co-construction needed preplanning or rather, the development of the skill to act with immediacy in the throes of the classroom curriculum on a daily basis. He explained his struggle with "the whole concept of co-construction" and raised the issue of wanting to know "whether it has to be a fully planned thing, like contrived, or whether in fact if you learn the skills enough you can seize the moments in your classroom to build that co-construction into the lesson?" (Jack, 2/7, p. 10). He continued his thinking in this area and by the end of Stage Two (6/11, p. 5) had made some decisions about this issue. He introduced ideas about the roles and interactions of students and the teacher, and underscored a focus on the "here and now" of the curriculum-in-action rather than a pre-planned notion:

> Everything about it is, I suppose, grabbing the moment and sometimes finding things that haven't been planned for, which are sometimes the best learning opportunities that happen. Whilst you can try and develop those things, I think that students themselves are the best developers of your co-construction ideas. It's them that really spark the whole thing. If they sat there all the time and just listened to the presentation then it would be pretty boring and dull, but they often provide unique opportunities to say yes, here's a great opportunity, here's a line you can take, have a look at this … it can get really interesting then. (Jack, 6/11, p. 5)

Giving directives

Several teachers expressed concern about teacher control of the classroom programme. They sought clarification about whether co-construction permits a teacher to give instructions and direct proceedings. One teacher after identifying his efforts to find out students' prior learning as an example of co-construction admitted his confusion:

> What else is co-construction? See I'm just very vague as to whether I'm co-constructing with them or not most of the time. I feel a lot of the time I'm forcing them to do something that I want

> them to do, so therefore I don't see that they are getting much opportunity [to have any say]. (Sam, 27/6, p. 1)

This identification of teacher control as not fitting with their understanding of co-construction was emphasised by another teacher: "I was in control the whole way wanting the kids to do things exactly as I wanted them to do it" (Rae, 19/6, p. 1). She continued her analysis of what she did and did not see as co-construction:

> But the fact that I'm standing there pretty much controlling the lesson … I feel that is still stuck in that … traditional model, whereas to me co-construction is more when you throw it out to the kids and let them try, and I don't find the way to whatever it is they are supposed to be doing … with less involvement for me. (Rae, 19/6, p. 4)

Another explained how he tried not to dominate in his classroom interactions:

> I was trying not to tell them so much wherever I could. I wanted them to come up with the recall knowledge that they had about measurement…. I was trying to do it in an open-ended way so that they could tell me, so I wasn't dominating … so I wasn't dominating the thought they were trying to…. (Tom, 19/7, p. 1)

Such conflict over the power and agency aspects of the teachers' and students' roles was problematic for some teachers throughout the research. The requirement of some student determination of lesson content or method continued to dominate the possible interactions; relinquishing some teacher power was seen as a pre-requisite. For some *any* teacher directive was seen as the antithesis of co-construction: it required student agreement or choice:

> Sometimes I don't actually think I'm co-constructing. I try and do some pairs work, and group work every now and again, and I keep thinking, "Yep, that's co-construction. I'm doing some co-construction," but then again sometimes I don't really know that it is, because I haven't actually said to the kids, "What shall we do?" (Rae, FI, p. 9)

The teacher's role and agency (and that of students) were still problematic for both Kate and Rae in the final interview (Kate, FI, p. 2; Rae, FI, p. 9).

The place of cooperative learning and other teaching strategies

The types of teaching strategies and approaches to group work, which might be used to co-construct, were a source of confusion to some teachers. Cooperative learning and its interface with co-construction was one example: "I guess that cooperative learning exercise is kind of like co-construction, because they are having to do all the thinking themselves and doing all the learning themselves" (Rae, 27/6, p. 1). She continued her process of clarification shortly afterwards by using the term "input" to mean participation and involvement in learning, rather than negotiating decisions:

> I try and think now what opportunities did I give for the kids to have an input, and I didn't think there was a heck of a lot except for when they do cooperative stuff where they're not really having an input into the lesson, but they are doing the learning for themselves. (Rae, 27/6, p. 7)

Similarly, another teacher compared the use of jigsaw to cooperative learning and clarified his view of co-construction which seemed to require the teacher to get student approval before proceeding:

> There's not a lot of co-construction there from my point of view, because I've just plonked the whole lot on top of them. I haven't said "Shall we do this this way?" to them, which would be co-constructing the activity. (Sam, 27/6, p. 7)

Even in the final interview one teacher still expressed confusion about cooperative learning and co-construction: "I still get co-construction and cooperative learning mixed up. Are they actually the same? … I'm not sure I know enough about the actual definition of co-construction really" (Kate, FI, pp. 1-2).

The issue of whether or how co-construction might include formative assessment interactions arose in Stage Two for one of the teachers:

> … probably not so much the co-construction, but just concentrating on the feed-forward academic and the feed-forward behaviour. Trying really hard not to say "You'll get a detention if you do that," but "You will understand a lot more if you quieten down and at least John will understand a lot more if you quieten down so he can understand." So I probably have been working

> more on that side of it rather than specifically co-construction. (Joy, 12/9, p. 5)

The term "co-construct" was used by some of the teachers to describe student-to-student interaction in the reflective interviews that followed the observations in Stage One, perhaps drawing on Māori concepts of *ako* (to learn and teach) and *tuakana-teina* (where an older child supports and teaches a younger one). Tom in his lesson on 17/6 used the strategy of a cooperative jigsaw, which requires students to learn a concept and teach it to others. It seemed accepted in the classroom that students learned from each other as well as the teacher. It was acknowledged that the teacher was not the only holder of knowledge in the classroom. The knowledge of a concept in the classroom was viewed as shared as a student explained: "What we know altogether about measurement" (Tomss, CO, 19/6, p. 7). The teacher gave guidelines to assist students in their co-construction with each other. He was setting up the procedures for a different classroom culture to that of a traditional transmission situation, with very different understandings and distributions of power and expertise. The expectation was that students would have expertise about the mathematical process and would be able to explain this to other students, with no need for them to turn to the teacher for such information except as a last resort: "If one person is doing all the work, ask the person what they are doing if you are not sure what they are. If she knows, you don't need me to answer" (Tom, CO, 19/6, p. 8).

Necessary resources

Many pedagogical innovations require the development or procurement of resources such as texts, tools or other materials to assist their implementation, and some teachers were alert to this possibility with co-construction. At a meeting of the Mathematics Department one teacher asked if resources needed to be made for co-construction: "I haven't sort of worked out what actually is a resource for co-construction yet. But if there are such things, you know, I want a blackline master" (Teacher, Meeting, 25/6, p. 6).

During the meeting, teachers shared ideas of strategies that could be used to co-construct across aspects of the classroom curriculum: environment, prior

knowledge, planning, activities, methods, formative assessment, summative assessment, reporting and evaluation (see also 5.1 and Appendix M), generating a resource that teachers reported later they seldom used.

Identifying what it is* not *is easier

Two teachers identified contrasting teacher-student interactions to aid their clarification of co-construction. Early in Stage Two, Sam started to use examples of what co-construction was *not,* to assist him to distinguish what it might be:

> I don't know … getting them to answer questions or trying to get them, rather than spoonfeeding. A lot of the time I think it's that … the times when I'm not spoonfeeding the answers to them, I think. Mostly that's the co-construction going on there. (Sam, 17/9, pp. 1/2)

He continued to use this technique even at the end of the research: "To me having a group there, showed no co-construction. Group work isn't co-construction" (Sam, FI, p. 1). He required a particular type of interaction that required negotiation with the teacher and student agency to fulfill his definition.

The other teacher contrasted the active student role in co-construction with the more passive in transmission: "where the students are more involved rather than being an audience" (Rae, 12/9, p. 2); and her own role as other than a transmitter: "Because I don't want to stand up at the board and be a talking tank … because I wanted to do something that was not the usual stand out the front" (Rae, 11/11, p. 2).

This section has identified several areas of tension that some of the teachers experienced in their efforts to clarify the practice of co-construction against the rhetoric that they had used to define it initially. The following section reports that many of the teachers' understandings changed over the time of the study and new areas of consensus became apparent.

5.2.1.3 Changing definitions and emerging consensus

Changes in the way teachers defined co-construction occurred over the study as might be expected given the dynamic interplay of teaching theory and practice.

This section explains how some teachers' definitions shifted, and describes four emerging areas of consensus which were evident by the final interviews. To do this I draw from material across the study, but particularly concentrate on the explanations from the final interviews to detail the changes, and to describe the commonly-held ideas of spontaneity, quality communication, active participation and graduated levels of co-construction that had become apparent.

Evolving definitions

Four teachers identified changes in their understandings of co-construction over the duration of the research (see also Sam and Jack, 5.2.1.2 above). The teachers concerned reported that this process of change was seldom easy.

One teacher explained how her ideas of what co-construction was had expanded since the initial *hui* to Stage One, from students having to make decisions about their learning: "I was looking at it in a very specific way, that *they* had to make decisions" (Joy, II, p. 6) to "students learning from each other" (Joy, 30/6, p. 1). In the final interview, she detailed further changes:

> I was down the aisle of that the kids had to make the decisions and … that we all learnt from the students, but now I realize it's a lot broader than that … I was very narrow-banded at the time and so I now see it as a mixture of group work that I was doing and things that they can do themselves. I think I take it all mixed up together now, rather than trying to … that's co-construction, that's group work … I try each day to do something that will make them do the teaching and do the learning themselves rather than being directed by me. (Joy, FI, p. 1)

Similarly, Rae (II, pp. 2-3) moved from using student input (meaning "giving the students a chance to or have a say in how they want things to be done or what, or how they might want to learn") or student choice, as core elements of co-construction, to students doing the learning themselves (Rae, 27/6, p. 1, see 5.2.1.2).

Despite the focus given in the previous section (5.2.1.2) to teachers' difficulties, there were many instances when teachers were more assured and displayed greater confidence in their identification of co-construction in their practice.

These examples, described in the previous chapter, *The Practices*, detail what teachers and students do when they co-construct. There was evidence that shifts were occurring in their practices. What emerged in the final interview and meeting, were distinctive models of co-construction from each teacher. They appeared, to different degrees, to synthesise their practice, and had developed connections and unique understandings of this approach over the duration of the research.

New areas of widespread consensus were evident in this interview, which add to the initial shared understandings of co-construction (as well as there being a continuing variation amongst the teachers in areas of concern and emphasis). The first widely agreed characteristic of co-construction was spontaneity, which is described next.

Spontaneity

The idea of spontaneity was an essential feature of co-constructive practice for all the teachers by the final interview. Earlier, only one had commented on this (see 5.2.1.2 above). The teachers' descriptions emphasised this important element of unpredictability in a range of ways. Co-construction cannot always be planned for: "That thing about the continuum, that came out of the blue … not a lot of planning went into it. It was just a spur of the moment, 'Yes, I'll do that'" (Tom, FI, p. 7).

> The more group work you do, the more activities the kids are doing on their own without me directing them, the more it happens without it being planned. And I mean, I don't plan lessons meticulously so I'm a bit spontaneous…. (Joy, FI, p. 5)

As Jack explained as he compared the spontaneous ("on the hoof"), with the planned: "Co-construction takes a fair degree of planning and whilst some of it can be … on the hoof at the time, that is a result of you recognizing that that is a co-construction moment to cherish and build on" (FI, p. 2). Another explained how co-construction has an element of unpredictability and produces its own momentum:

> I think once it's started, it's like sort of a rolling thing. Once it starts I think it's more likely to keep on happening because it works and it feels good, so I think it is just a matter of doing some and the more you do I think the more you will do. (Kate, FI, p. 3)

Quality teacher-student communication

Continuing quality communication between teacher and students was another essential of co-construction about which the teachers were in accord. All the teachers made this point but used varying terms. It was expressed variously as "needing to keep in touch with students' learning" (Joy, FI, p. 9); "including students and making them part of the team" (Kate, FI, p. 3); "the major thing is that … is the kids, hearing the kids. It's hearing the kids" (Rae, FI, p. 3); "to be a good listener to what's happening and to be part of the conversation which is happening within a group…."(Jack, FI, p. 4); "I want the kids to have a say in my class" (Tom, FI, p. 28). Both speaking and listening were stressed.

Active participation

The understanding of co-construction that teachers evolved, required an active learner. Active participation by students was viewed as crucial. The teacher-directed transmissive classroom where the student is passive (see explanations such as Freire's of active and passive learner roles in Chapter 2), was contrasted with an environment of co-construction, which has active student participation in the classroom, and for some teachers a change of the roles and interaction patterns between themselves and their students. One teacher described this as:

> The teacher, not necessarily taking a backward step, but being used as a facilitator in terms of the learning of the students, and allowing the students to take a much more active, participatory role in the lesson (p. 2). When the students are asking the questions, rather than the teacher asking the question and getting the answer back, which is the traditional way, and if you can reverse these roles then you're in the position of co-construction. (Jack, FI, p. 5)

Another explained this difference as incorporating greater contributions from students, and more interaction and sharing in how learning is undertaken:

> Allowing them to either make decisions or have their say, or contribute to some aspect of the way things are run in the classroom. Probably a lot more working with each other, perhaps group work, pairs work … rather than me the teacher standing at the front and lecturing, with the kids just sitting there and taking it all in. There's a bit more sharing going on. (Rae, FI, p. 3)

And another described it as providing opportunities for students to take responsibility for and make decisions about their learning processes. This required students to use the ideas and resources that the teacher provided to develop their answers themselves, rather than depend on the teacher telling them the answer. This meant students needed to develop a mindset where "they give me the answers, they're contributing, … they're participating and they're engaged" (Tom, FI, pp. 4-5).

Graduated/incremental models

The teachers' descriptions of co-construction developed over the study to include distinctions of degree or level. Half of the teachers explained their model of co-construction by using terms of graduation such as "levels" or "forms" to distinguish varying amounts of student autonomy and input. For example, Joy (FI, p. 2) identified three levels; Sam (FI, p. 4) made a distinction between "small" and "large" sides of co-construction, and formal and informal; and Jack talked of "small" and "large" forms (FI, p. 1). Their explanations used their own terms rather than memorised phrases, and as might be expected, showed greater complexity and elaboration than their initial understandings. Table 5.1 summarises the development of their understandings.

The theme of evolving understanding tracked the way teachers explained co-construction over the time of the study. It started with their first ideas that were mainly extracted from *Te Kōtahitanga* project, covered areas which some sought to clarify as they tried to implement and identify their own co-constructive practice, and ended with their conceptions one year later. The following section discusses some of the significant issues this theme raises.

Summary

Table 5.1 *Summary of teachers' understandings of co-construction*

Initial understanding	Evolving understanding
Partnership with students Working with students Students having input into content Students having input into methods Students having input into learning environment Power-sharing Moving *away* from teacher-directed classroom Moving *away* from transmission delivery	*Initial understanding plus the following:* Students teaching and learning from each other Students are actively participating in learning Planning is not always possible Has an element of spontaneity, unpredictability On-going quality communication between teacher and students is crucial There are varying qualities of co-construction: the extent of student input is the measure

5.2.2 Discussion: Evolving understandings

This section takes up several major points that are raised by the preceding account of how teachers' understanding of co-construction developed and changed over the time of the study, as they sought to connect their interpretations with their classroom practice. The issues that will be discussed in relation to the findings are: the imprecision of, and variation within, terminology usage; power, control and authority; some of the difficulties in implementing pedagogical theory; and comparisons with other constructivist pedagogies.

Terminology matters

Matters arose about understandings of simply couched abstract ideas being difficult to exemplify, and confusing usages of the term co-construction.

Imprecise abstract terms

It can be difficult to easily provide classroom examples of some pedagogical ideas. When theoretical constructs are explained to teachers, often simple, catchy phrases are used that capture the essence of the ideas. Definitions are an example of this. The initial explanations of co-construction that the teachers gave, used memorable, simple words such as "partnership", "work with students", *"mahi tahi"* (working as one), 'power-sharing", "give more power to students", "get students' input into decisions about what and how they learn". These replicated the explanations of co-construction (Bishop & Glynn, 1999; Bishop et al., 2003) that they would almost certainly have experienced as part of *Te Kōtahitanga* PD. However, when the teachers tried to operationalise these quite vague and very general ideas, thinking through what would happen in their classroom to bring them to life, confusions and difficulties arose. Some used contrast to try to clarify what co-construction was, as Sam exemplified in this study (see 5.2.1.2 above) with his "*not* spoonfeeding". V. Richardson (2003) attributes such teacher actions to the lack of a clear constructivist teaching theory.

Confusing usages: strategy or pedagogical approach?

Terminology must be utilised very carefully when introducing new theories and understandings. Pedagogical theory is more useful to teachers if it can easily be linked to practice. If it translates into identifiable practices, interactions or strategies that can be understood by teachers, it is more likely to be reflected widely in classroom practice. Some of the teachers in the initial stage of the research seemed to view co-construction as a strategy rather than a pedagogical approach (which can use a plethora of strategies), possibly because of the way the terminology had been used in *Te Kōtahitanga* project. "Co-construction" featured as one of the identifiable interactions or behaviours on the classroom observation schedule (called "the tool") along with feedback/feed-forward behaviour (FB/FFB), feedback/feed-forward academic (FB/FFA), prior learning/ knowledges, and so on (see Chapter 3 and Appendix H). Yet confusingly, the definition of it was as an activity which "would include all or most of the previous categories" on the tool (Bishop et al., 2003, p. 126). So it was both one interaction and potentially all the interactions: everything that happened in the classroom.

This was perhaps at the heart of much of the discomfort teachers felt in trying to clarify their understandings of co-construction.

My understanding of co-construction, as a sociocultural constructivist pedagogical approach with emancipatory interests (drawing on previous models such as Boomer et al., 1992, and Brown & Campione, 1996) supports the "discursive" classroom model (see Bishop & Glynn, 1999, p. 147). I would expect this to involve a collaborative partnership between teacher and students to develop and enact their classroom curriculum. Co-construction potentially permeates the whole educational experience. Learning is assumed to be essentially a collaborative process. As such, a co-constructive approach would include a wide range of teacher-student interactions and teaching and learning strategies, including all in Bishop et al.'s (2003) tool, but the underpinning intentions and values of the teacher would be the pivotal concern.

When teachers were asked to identify strategies and particular interactions in their reflection on their classroom lesson as examples of what is an underpinning philosophy, this possibly caused difficulties. One would assume that the latter does require the former, but perhaps the focus was too strongly on strategies, as Sam's comparison with cooperative learning suggested (see 5.2.1.2). As part of *Te Kōtahitanga* project, the teachers had extensive workshops on cooperative learning, which uses very specifically prescribed activities, strategies and procedures (Brown & Thomson, 2000). Perhaps, some of the teachers were expecting a replication of this, a similarly clear range of tightly specified activities, to be implemented according to strict guidelines. If teachers did not think of co-construction as a coherent pedagogical model, but as a group of isolated classroom strategies, this could also impede their interpretations (Windschitl, 1999). Furthermore, it may be difficult for a teacher to present clear examples from memory, given the complexity and unpredictability of classroom experience. It is recognised that much teacher behaviour is habitual, tacit, even unconscious (Atkinson & Claxton, 2000; Knight, 2002). This issue was referred to in the previous theme where there was a mismatch between teacher perceptions and the researcher's observation of their practice.

The focus of some of the teachers on readymade resources as the answer to implementation of co-construction, rather than being able to develop their own practice based on their understanding of what they were hoping to achieve, mirrors the confusion over strategies and pedagogical approach which pervaded the early stages of the research.

Power relationships and expertise

The understandings that some teachers had about terms such as power, control, and expert and their positioning, raised some issues. As part of *Te Kōtahitanga* they would have been exposed to Bishop and Glynn's (1999, Chapters 4 and 5) theorizing on unequal power relations in education, and how these can be redressed with new metaphors, positionings and pedagogies. However, rather than sharing power with students and recognising the teacher's professional role requires that they retain the overall responsibility for the classroom curriculum/programme, some teachers' understandings seemed to be that they should almost totally relinquish teacher direction of the class - a *laissez faire* type of relationship with the students. Binaries seemed to shape the thinking about power of several teachers. The term seemed to set up a dichotomy of the teacher having either *all* the power or *no* power; losing sight of the reality, that students have always had power in class to agree and assist, or to refuse, to disagree or to disrupt. There may be other more useful ways of representing the power relations in the classroom.

Co-construction also requires new discourses about who is the expert. The teachers were all, to varying degrees, learning about new ways to position themselves in their classroom roles, and to reconfigure their relationships with students in new ways. As the example from Tom's classroom exemplifies (see 5.2.1.2 above), the teacher is no longer viewed as the *only* authority or expert in the classroom: "the keeper of the knowledge" (Mestre, 2005, p. 26). Klein (2000, p. 22) explains this shift as involving a new view of "who is privileged with the authorship of the ideas, meanings and actions that are seen to be relevant in the classroom: sometimes at least it should be the students."

Some teachers used co-construct to describe student-to-student interaction, perhaps drawing on Māori understandings such as *ako* (learn and teach) and *tuakana-teina* (older student supports and teaches younger student). I had always conceptualised co-construction as between student and teacher. Therefore, this was a new usage for me and made me particularly concerned that my understandings should not override those of the teachers. Their broadening of the concept in this way supports their growing acknowledgement that there are potentially many teachers in the classroom.

Bringing theory to practice

The theory/practice divide or relationship has long been acknowledged in educational writings (e.g., Korthagen & Kessels, 1999; Kroll, 2004; McInerney, 2005; Mintrop, 2001; Siegel, 2005; and the journal, *Theory to Practice*). The challenges of implementing social constructivist pedagogy are also widely accepted (Applefield et al., 2001; Brooks & Brooks, 1999; Good & Brophy, 2008; Holloway, 1999; Klein, 1998; Nuthall, 2002; Perkins, 1999; V. Richardson, 2003; Sfard, 1998; Windschitl, 1999). So some discomfort is to be expected as teachers reflected on their current practice and tried to make the abstract concrete (with no definitive blueprint, e.g., jigsaw). There are three aspects of this process that the findings illustrate which are explored below: the lack of uptake of innovative pedagogy from pre-service teacher education; the need to question the extent to which a pedagogical model is fixed and immutable; and how distinctive the understanding and practice of such an evolving pedagogy can be across individuals.

Preservice theory not applied in practice

Most of the teachers knew little about constructivist epistemology and pedagogy. Most had recollections of similar ideas from their teacher education, yet had seldom made efforts to sustain such pedagogy in their classrooms. Many researchers have identified this as an ongoing issue (Klein, 2001; Korthagen & Kessels, 1999; Lortie, 1975). The reasons are complex, but the reinforcement of years of classroom experience of transmission is not easily ignored. Klein's (2000) post-structural analysis of mathematical discourse exposes the continuing

strength of traditional positioning of the roles of teacher and textual authority. The teachers themselves recognised the importance of professional development such as *Te Kōtahitanga* to awaken them to conscious reflection on their practice. However continuing growth, change and sustainability are issues.

Core elements

Some teachers recognised certain strategies as core requirements of a co-constructed classroom. The identification of planning the content of the classroom curriculum with students as an essential element of co-construction, which few teachers identified as something they were able to do, raised the issue of how flexible, varied and extensive a co-constructive pedagogy could be. If the teacher could not involve students in such decisions, that is, have a formal planning session with students before the commencement of a unit or topic, then many felt they could not co-construct. The use of Cook's (1992, p. 21) four questions to use when planning together at the start of a unit, as one example of how one could approach co-construction (which was part of my workshop with the teachers prior to the research) could also have underscored the uncertainty. The mathematics department had a policy of identifying the annual subject content for each year level and this was displayed in the teacher resource room as a timeline with common test times marked (Appendix N). So to most teachers, content was viewed as fixed and not able to be co-constructed with students.

Other teachers seem to have had a greater flexibility in their understandings of content and curriculum. Grundy (1994) clarifies several meanings that distinguish the curriculum-in-action in the classroom from such usages as the prescribed content or topics. If one uses the *classroom curriculum* to describe the day-to-day interactions in a classroom, in which all participants in the educational process, including teachers and students, are actively involved, then a different perspective is available which makes each class a potential site for co-construction. From this perspective co-construction-in-action in the classroom can be understood to cover the identification of prior learning, formative interactions between teacher and students, and interactions between students, where the immediate decisions are

made about where the curriculum of the class, groups or the individual will progress in a particular lesson.

Evolving individual understandings

The teachers' experience over the time of the research demonstrates how varied and individual understandings of pedagogy may be. For many, their understandings changed from a narrowly specified range of student-teacher interactions, described in broad terms, to a widening encompassment of many techniques associated with a social constructivist pedagogy. Their explanations of co-construction later in the research demonstrate idiosyncratic variations, and terms that emerge from their unique experiences and prior learning. For many of the teachers the struggle mirrors what they might expect in their students' learning. The focus on the issues which were confusing for some of the teachers in their development of co-constructive practices is useful, as it clarifies the aspects which require clearer elaboration, further exploration and questioning.

The emergent core characteristics compared with other models of constructivism

Four common features emerged from the teachers' attempts to implement co-construction in their classrooms. These were the notion of an active learner, spontaneity in the teacher's approach to the classroom, quality teacher-student communication, and the explanation of distinctive graduated personal pedagogical models. Are these characteristics shared with other models of social-constructivist pedagogy?

The description of the role of the learner as active is universal in explanations of constructivist pedagogy (Airasian & Walsh, 1997; Brooks & Brooks, 1999; Le Cornu & Collins, 2004; Mayo, 2002; Mestre, 2005; Perkins, 1999; Phillips, 1995; Terwel, 1999). Indeed, a central tenet of constructivist learning theory is the construction of new knowledge by the learner: *they control their learning*.

Similarly, spontaneity also features widely in writings about constructivist pedagogies, though it is expressed in different language. For example, Windschitl

(1999, p. 753) explains constructivist teaching as being "less about the sequencing of events and more about responding to the needs of the situation". Airasian and Walsh (1997, p. 447) describe "'a learn as you go' approach for both students and teachers." Sherin (2002, p. 122) explains an "adaptive style of teaching" which has been previously described variously as "inquiry", "discovery", and "improvisation", in which "the teacher must make on-the-spot decisions concerning what mathematics to pursue and how to pursue it" because teachers have to "attend to the ideas that students raise in class". Likewise, Good and Brophy note that "on the spot decision making" is recognised as a characteristic of constructivist approaches (2003, p. 434). The unpredictability of a constructivist class, which the teachers in this study also identified, finds widespread agreement in the literature.

A focus on quality communication between teacher and learners is also common. Some constructivist pedagogies are given names to emphasise this, for example "dialogue" (Mayo, 2002, p. 291), "conversation" (Applebee, 1996), and "engagement" (Mestre, 2005, p. 24). In addition, there is frequent reiteration of the need for teachers to listen and students to talk in most explanations of such pedagogy, such as: "Teachers seek and value students' points of view" (Brooks & Brooks, 1999, p. 21).

It is uncommon to find accounts in the literature that personalise models of constructivist pedagogy (a notable exception being provided by Zellermayer, 1997), or describe graduations of practice. In most instances, literature reports the developed model of a researcher/theorist and describes how teachers implement the model (Mintrop, 2004; Sewell, 2006; Sherin et al., 2004; Wells, 2002). However, Knight (2002, p. 3) affirms: "constructivist pedagogy is more general than specific, thereby allowing teachers the freedom to construct their own individual pedagogy based on constructivist principles." This does seem to be what occurred for the teachers in this study.

This section has discussed important points that arose from the theme of teachers' evolving understanding of co-construction. Parallels with other literature were

drawn and departures noted; the core characteristics of co-construction that evolved from this study were compared with the body of research literature revealing strong similarities overall. The following section reports the next important theme, the constraints: what gets in the way of the easy implementation of co-construction.

5.3 Potential constraints

5.3.1 Findings

One of the main themes that emerged from the study was the constraints participants reported that impeded co-construction. A broad range of concerns was identified and discussed, especially by the teachers, throughout all parts of the study from the initial interviews, their reflections on their lessons, through to the final meeting. The main factors that comprise these constraints are categorized as beliefs about pedagogy, diversity, and work issues. These three sections give a brief overview of some of the complexity and difficulties, ideological and practical, of trying to co-construct in a secondary school. The first of these sections highlights the influence of beliefs about pedagogy.

5.3.1.1 Beliefs about pedagogy

A number of beliefs about pedagogy seemed to contribute to resistance to co-construction, in particular understandings of pedagogy, the roles of teachers and students (in particular with regard to teacher authority and expertise), and issues of culture change.

What is good pedagogy?

Throughout the research most teachers emphasised a teacher's beliefs about pedagogy as critical to their uptake of co-construction:

> If the teacher doesn't believe that there is any value in co-construction or working in any cooperative sort of way or allowing the kids any say … obviously they're not going to want to take it on board or want to give it a go. (Rae, FI, p. 22)

Transmission as pedagogy has a long legacy of legitimacy and success in secondary schools. The initial interviews revealed that despite teachers' claimed interest in co-construction, many also harboured scepticism about its value and recognised the strong influence that transmissive teaching still had. For example, three teachers identified themselves and others, as successful teachers and learners in the transmission tradition (Joan, II, p. 4). Lengthy practice of, and belief in, the efficacy of a traditional approach was a potential impediment to five out of the seven teachers feeling any need to change to a more co-constructive classroom environment.

Teachers' misunderstandings about what co-construction was (Sam, FI, pp. 23-24) (see 5.2), restricted conceptions of the possible detail of practice (Joan, II, pp. 15-16; Rae, II, p. 6), and reservations about its suitability to mathematics (see 5.1) could limit the resolve to implement and make identification of strategies used difficult. The habitual, intuitive nature of much practice further complicated the naming of co-constructive discourse and behaviours (Joy, II, p. 7; Rae, 19/6, p. 4; Tom, 25/6, p. 6; Sam, FI, p. 2). The need to produce clear evidence of improved student achievement through testing also concerned some (Tom, II, p. 23; Joan, II, p. 16).

Students' understandings of pedagogy can also play a defining part in the trialling, uptake and sustainability of new co-constructive approaches. Initially, several of the teachers aligned their students' view of pedagogy with transmission (Jack, II, p. 7; Tom, II, p. 9). This continuing perception by some teachers: "… of how well we have trained students in transmission learning … that they enjoy the fact that they don't have to think, that they can sit down and absorb" (Jack, 28/10, p. 4) (Joy, 23/10, p. 4) was reinforced by some students' descriptions (both senior and junior): "Yeah that's the way we've been taught from primary school - the teacher tells you" (Jackss, 28/10, p. 3). The term "spoonfeeding" was used by three teachers (Sam,17/9, p. 2; Jack, II, p. 4; Rae, II, p. 13), and also some students to describe the transmissive pedagogical process.

The department, school and education system's views of appropriate pedagogy can also constrain the development of a culture of co-construction. Structures,

expectations and practices may make co-construction difficult to implement. For example, the topic timeline in the maths department in the junior school, with its common assessments (see Appendix N), set up an expectation of coverage, conformity and time restraints (Tom, FI, p. 26) which all teachers involved admitted restricted the classroom curriculum (Rae, 19/6, p. 7; FI, pp. 21-22; Sam, 27/6, p. 2). Two teachers commented that if the pedagogy is not valued by the school as a whole, led by senior management, followed by a groundswell of teachers in a department wanting to share resources and ideas, the uptake of co-constructive practice would be inhibited (Tom, II, p. 18; FI, p. 23; Roy, II, p. 33). Problems can arise if there is not schoolwide consistency in approach, and students experience very dissimilar pedagogies and expectations across classrooms (Tom, FI, pp. 14-15). The domination of transmission in secondary schooling was illustrated by the changes in pedagogical style a teacher made when he moved from the primary system (Tom, II, p. 20; FI, p. 22). The national constrictions on pedagogy arising from NCEA prescriptions were also clearly numerous (see 5.3.1.3).

This section has explained how the hegemony of transmissive pedagogy prevails, making teachers, students and schools sometimes disinclined to accept new ways. The following part identifies particular aspects of teacher roles that became problematic for some in the shift to a co-constructive pedagogy.

The roles of teachers and students in pedagogies

Variations in the expected roles of teachers and students between transmissive and co-constructive pedagogies can constrain the uptake of co-construction. Students' perceptions and actions can inhibit the development of new ways of being in a classroom. A co-constructive approach adds new moves to those emphasised by traditional transmission. Many of the students expressed discomfort with co-construction as it seriously altered the roles of both teacher and student, which they described very traditionally, reinforcing particularly the teacher roles of expert and authority in the classroom, and the student role as responding to teacher direction. Some junior students described their understandings of teaching as telling and instructing (Joyss, 12/9, p. 1). Several senior students similarly

described a teacher's role as to be helpful, supply notes, keep control and students' focus on work, listen to students' needs and *teach* (Jackss, 6/11, pp. 1-3, 11-12). The role of the student was the converse of this:

> Work. Listen. Respect the teacher. Do your work. Do your homework. Do what they ask.... If we put the effort in and the work and do the exercises that they assign you, then they can move on … the old style … the teacher teaches you, you learn, kind of spoonfed the notes and stuff, it just works. (Jackss, 6/11, p. 3)

Initially, most teachers found the idea of relinquishing aspects of their expertise and authority to co-construct problematic. They provided many examples of being "imprisoned in the teacher box" (Sam, 8/3, p. 5). (Joy, 11/11, p. 6). For example, curriculum content (though designated as pivotal in many teachers' definitions and understandings of co-construction) was not seen as an area for co-construction with students, rather the prerogative and responsibility of the teacher (Joan, II, p. 9; Sam, II, p. 11; Joy, II, p. 7). Even if a teacher was willing to co-construct content with students, disquiet was expressed about the capabilities of students to do so because of their presumed lack of knowledge of a subject and its structure (of what there is to learn and its optimal sequencing) (Joy, 11/11, p. 8), possibly different understanding of priorities (Sam, II, p. 4; Joy, II, p. 4), or complete lack of ideas (Sam, II, p. 6). Similar concerns over knowledge and structure of subjects came from some students (Jackss, 28/10, p. 2).

One of the teachers had concerns about students' ability to make suggestions about how they might learn and explained this by relating his own difficulty as a teacher in sometimes deciding on such a process (Sam, II, p. 19). In other instances, students' limited ideas of how a task could be developed might throw the whole undertaking back onto the teacher, causing extra workload, as one teacher described from past experience (Rae, II, p. 4).

Some students, senior and junior, suggested barriers to dialogue (how they feel about certain teaching strategies) related to their consciousness of the possible professional sensibilities of teachers. A teacher's expertise is in facilitating learning, so for a student to query the way they are being taught, might be seen as disrespectful or offensive (Samss, 27/6, p. 3; Jackss, 4/11, p. 3).

To become more co-constructive in their pedagogy required conscious effort by the teachers to change their classroom behaviour, which could be stressful. Such efforts to change from a "talking tank" culture (Rae, 28/10, p. 2) alter the dominant, comfortable positioning of the teacher from centre stage (Kate, FI, p. 20; Jack, FI, pp. 4 & 7); and included learning to listen to students in new ways (Joy, 6/11, p. 5); trying to refrain from giving students the answers (Sam, 17/9, p. 3); pushing oneself not to be the expert (Joy, 5/3, p. 4); and explaining to students the constraints on what the teacher could do (Sam, FI, p. 14; Joy, 11/11, pp. 7-8). While most teachers felt restraints around co-constructing, the counter case also arose. Once established as *modus operandi*, one teacher felt the stress and responsibility of keeping the co-constructive classroom culture going, otherwise he felt he was short-changing his students (Tom, 6/11, p. 4).

Management of students' behaviour (control) was a theme that emerged as an important constraint on co-construction in Stage Three, when it was posited as an important consideration when starting with a new class. Classroom management arose as a major focus for three of the four teachers who were revisited at the start of a new year with their new classes. They reported that it was not possible to embark on co-constructive practices to any extent: "Basically, because I've felt like I've been trying to gain the control, classroom control. I haven't really felt like I'm in a position where I've got good enough control to then allow them to be able to work" (Rae, 15/3, p. 2). (Rae, FI, p. 6; Sam, 8/3, pp. 3-4; Tom, FI, p. 5).

Teachers repeatedly used "trust" to describe the relationship needed: "a high level of trust between student and teacher" (Jack, FI, p. 4). They needed to be able to trust that the students would behave before they felt comfortable to co-construct: "Do you trust them to do what you want when you ask them to get into groups, or something like that?"(Tom, FI, p. 6) (Rae, 15/3, p. 2; Sam, FI, p. 3). (See section on pedagogical content knowledge and class diversity later in this theme.)

The openings for co-construction early in the year with a new class were seen as very few until the desired class culture or climate had been achieved: "It is about setting the patterns for the class and what the expectations are before you can

move on to the other things" (Jack, FI, p. 15). (Rae, 15/3, p. 2; Sam, 8/3, p. 4). However, one teacher questioned whether this reticence to move into co-construction early with a class was inflexibility or the force of old habits (Sam, 8/3, p. 3).

This section has described, from both students and teachers' viewpoints, how traditionally important aspects of teachers' roles, such as taking sole responsibility for the classroom curriculum, and controlling student behaviour, can constrain their uptake of co-construction. The following section reports how students, in particular, can curb pedagogical change.

Culture change: student resistance as constraint

Students' resistance can be a major restraint to teachers developing co-construction. In this section the reasons for student resistance are reported, including the seeming preference of some for transmission, and dissatisfaction with particular new strategies and roles.

Those teachers who taught senior classes noted more resistance to the trialling of co-constructive strategies at these year levels than with junior classes (Jack, Sam, Joan, Rae). Students' resistance can cause a teacher to abandon their attempts to change their pedagogy:

> Try to do something different, like put it back onto them to have to come up with ideas and have some input. They resist it. I've found with my year 11 this year and last year, when I've tried that sort of stuff, they don't like it, they want to be spoon fed. They want to have it dished out to them, and so I haven't pushed it. (Rae, II, p. 13) (Jack, II, p. 4)

Such professed preference for transmission was a major reason reported for some students' resistance both by teachers and a range of both junior and senior students. The students, having been "turned very successfully into sponges" (Jack, FI, p. 9), wanted to continue in transmission mode, despite their teachers believing that this was not the most effective way to learn. They resisted the new responsibilities and behaviours expected. Four teachers detailed such experiences (Jack, FI, p. 8; Joy, II, p. 6; Sam, FI, pp. 18 & 21; Tom, II, pp. 8-9).

Students employed a range of ways of communicating their resistance. One way was with forthright statements to the teacher such as: "When are we going to go back to *real* teaching, sir? … When are you going to go back to teaching us, sir?" (Jack, II, p. 4). (Rae, II, p. 13). Teachers and students noted that students might also show their disenchantment by not participating, not working (Kate, 30/10, p. 2; Rae, II, p. 13; Joyss, 6 /11, p. 2), and by deciding how much work they would do, and at what pace: "Because what we want to do we do, and the work we don't really, we go slow" (Raess, 11/11, p. 1).

Sometimes, from the students' viewpoint, strategies had imperfections. One prime example was the use of expert groups (jigsaw) in a senior class (where students learnt the content and then taught each other) (Jackss, 6/11, pp. 8-11). Students and teachers identified time and coverage anxiety as areas of concern (Jack, II, p. 13; Sam, FI, p. 8). The quality of their learning also worried some students:

> None of us even knows it now 'cause we had to teach each other…. And we tried to point out that it was really stupid and that we hate teaching each other because that's what a teacher's for … it was a waste of five days when we don't actually know it anyway. (Jackss, 28/10, p. 3)

A co-constructive pedagogy can require students to change some classroom behaviours. The particular aspects reported as problematic included: knowing how to ask questions (Sam, 4/11, p. 3); preparing questions for each other (Joy, 23/10, p. 4; 28/10, p. 1; Rae, 15/3, pp. 3-4); broadening the accepted sources of expertise to include classmates, texts, posters, homework books as well as the teacher (Joy, 5/3, p. 3); accepting responsibility for their own work (Tom, II, p. 8); helping others (because they retain a competitive view of the learning environment) (Joy, 23/10, p. 2; Jack, FI, p. 8); and not wanting to participate actively (Tom, FI, pp. 12 & 14; Samss, 4/11, p. 4).

Learning new ways of working in a classroom takes time to become habitual. Most of the teachers at some point suggested another reason for resistant responses was that teacher scaffolding, and repeated practice of skills was needed to familiarise students with new pedagogies (Rae, II, p. 13; Joan, II, p. 7; Sam, II, p. 6). (See also 5.3.1.2.) Also, some students saw no need for change in the

systems already in place in the school. For example, several senior students saw no need to have input into their reports, or the reporting interview, because of the perceived difficulty for teachers of speaking frankly about problems in the presence of the student (Samss, 4/11, p. 4; Jackss, 6/11, p. 6).

This section has reported how traditional beliefs about teaching and learning and the roles of students and teachers, can fuel student resistance, putting considerable restraints on what innovation happens in a classroom. The next section reports how people's diversity in personality and preferred ways of working can impact on the implementation of co-construction.

5.3.1.2 Diversity

Teachers commonly noted the diversity amongst themselves and students, to explain difficulties and lack of uniformity in the uptake and success of co-construction. As individuals, in groups and as classes, there are perceivable differences in the way students respond, interact and work, which always makes teaching unpredictable.

Teachers

Variations between teachers were mainly attributed to personality traits, subject and pedagogical knowledge. Personality was often the reason given for differences in success with co-construction (Kate, FI, p. 21; Sam, FI, p. 32), possibly a more potent criterion of success with a class than the greater use of co-construction (Joan, II, pp. 22-23). Teachers felt co-construction varied because of particular personal traits strongly related to teacher efficacy and identity - energy, confidence, willingness to take risks, and perseverance.

Most of the teachers viewed subject knowledge as essential to any teaching (Rae, FI, p. 22), but especially important to co-constructive practice. One explained: “It gives you that freedom that if certain questions come up you don’t feel threatened” (Kate, II, p. 4). A connection between confidence and innovation was suggested (Sam, FI, p. 32; Roy, II, p. 37). Feeling that one lacks knowledge can lead to closed, safer pedagogies: "because I might not know the answer, it was

really easy to say, "Open this. Do this page, da de da de da" (Tom, FI, p. 21). Also, the way co-construction can highlight the diversity in students' learning and achievement in a class makes subject knowledge crucial to deal with the differences that emerge (Jack, FI, p. 4).

In relation to the mathematics curriculum, subject sequencing was important (Joy, FI, p. 23). Such knowledge was also important to students who put their trust in the teacher knowing. One teacher (Sam, 17/9, p. 8) and his senior students agreed that they depended on the teacher's background and depth of knowledge in a subject to inform and sequence their learning programme (Samss, 30/10, p. 2). (Jackss, 6/11, p. 15).

Limited pedagogical subject knowledge was identified as an important impediment to co-construction by several teachers. One teacher who was new to mathematics teaching, explained: "I feel I know the work, it's just understanding all the different ways I could teach that" (Kate, II, p. 9). (Kate, FI, p. 4; FI, p. 19). In contrast, her more experienced colleagues were able to identify the suitability of a topic to particular strategies (Rae, 27/6 p. 2; 21/10, p. 7; Joy, 12/9, p. 7; Tom, 16/3, p. 1). Another teacher felt that the pedagogical tradition of textbook usage in mathematics made it easy to fall into that mode (Rae, FI, p. 5).

During Stages One and Two, teachers' reflections on their practice highlighted further constraining issues related to pedagogical knowledge. The need to have a sizeable pedagogical repertoire could prove daunting, as could the flexibility of thinking and action to cope with the specifics and uncertainties of the particular classroom context (Joy, 17/6, p. 7). There is a potentially great measure of uncertainty about where a lesson might go. When a teacher is replanning in the course of the lesson, it is in relation to their immediate knowledge of students' knowledge, their own pedagogical repertoire and other significant dynamics, such as student attitudes, time available, resources and so on. Their decisions emerge from the specific context of the moment (Joy, 17/6, p. 1) and highlight the need to make judgements on the run (Joy, 17/6, p. 3): "you can plan as much as you like, but once you are actually in the classroom, things take over and you are making

decisions based on where the kids are at" (Joy, 17/6, p. 10). For example, strategies to access students' prior learning can be disconcerting if a teacher expects a considerable resource in the students and finds otherwise (Joy, 17/6, p. 3; FI, p. 5; Sam, FI, p. 11).

Teachers' distinctiveness, as reported here, guarantees variation in the development of pedagogy; likewise students, individually and in various combinations, as the following reports, challenged the notion of uniform implementation.

Students

Students as individuals, in groups and classes, respond diversely and raise issues that might impede the uptake and practice of the pedagogical approach. A student's personality can impact on class dynamics and make co-construction difficult. Several teachers raised examples of what they termed "individualistic", "egocentric", or "moody" students and their influence (Kate, 30/10, p. 2; Jack, FI, p. 10; Joy, II, p. 13; 5/3, p. 5; Roy, II, p. 28; Sam, FI, p. 13), which can obstruct the trust needed with the whole class to innovate (Sam, 8/3, p. 13; 16/3, pp. 1-2). At least three of the teachers felt personality was a factor in students' resistance to co-construction. Some people like structure and instruction, and feel anxious if they are required to participate actively, make decisions and take responsibility (Joy, II, p. 20; FI, p. 11; Jack, II, p. 12; Roy, II, p. 10).

Individual students vary greatly in their attitudes to their education and subjects. Some with negative attitudes towards education want to avoid learning, displaying what one teacher described as the "staunch factor" (Kate FI, pp. 11-12). (Sam, FI, p. 5; Roy, II, p. 30). Students' previous experience of a subject can interfere with their willingness to engage with the current classroom programme: "You get it all the time. They say they don't like maths, so because they don't like it they're not going to bother trying"(Sam, 8/3, p. 4). Some students agreed (Katess, 30/10, p. 3). Peer, teacher and parental influence can impact on the willingness of certain students to become involved. A parent might say: "Hey, don't worry about it. You're bad at maths. I was bad at maths" (Joy, FI, p. 10).

(Sam, FI, p. 21). One way that students can show their dislike of a subject is by not coming to class (Joy, II, p. 13; Sam, FI, pp. 15 & 19). Students also occasionally acknowledged that they may relate better to some teachers than others (Joyss, 28/10, p. 2).

Co-construction, in contrast to transmission where often all the students in the class are given exactly the same information or tasks, particularly highlighted the need for differentiation and personalisation of learning within a class. Teachers frequently noted variability in relation to many aspects of individual students' work and attitudes such as (Jack, 23/10, p. 3): the work covered (Jack, 4 & 6/11, p. 3); the divergence in understanding (Jack, 28/10, p. 1); the disparity in the gaps in knowledge or understanding (Jack, 23/10, p. 5); the speed to complete tasks (Joy, 23/10, pp. 4-5; Rae, 15/3, p. 5; Tom, 6/11, p. 4; Jack, 4 & 6/11, p. 3); in what they want to do (Rae, 28/10, p. 3); in achievement (Tom, 6/11, p. 4; Jack, 4 & 6/11, p. 3); their willingness to participate by asking questions; and their acceptance of others' mistakes (Rae, 6/3, p. 3).

Individual students' personalities, attitudes and behaviours can impact on a teacher's intent to co-construct. Using groups is a common strategy for the pedagogy which can pose further problems. These concerns related to the responses of specific groups of students, group dynamics and work habits. Teachers had mixed views about how the response of specific groups of students might constrain the development of the pedagogy. Several teachers thought that International students, mainly from Asian countries (of whom there were small groups in many classes), would find co-constructive practices rather strange and perhaps upsetting because of their presumed experience of didactic classrooms, and the language barriers (Jack, FI, p. 1; Roy, II, p. 41), especially with the technical side of the language (Sam, FI, p. 22): "they are so used … to being told what to do and when to do it … where are you coming from?" (Joan, II, p. 22). This was illustrated by an example from Art: "What colour should the sky be? They look at you…. Why aren't you going to tell me?" (Roy, II, p. 8).

A co-constructive approach is promoted as being particularly suited to Māori (Bishop, 2003; Bishop et al., 2003). However, teachers' views varied about whether this was the case. Five teachers felt neither ethnicity nor gender was a factor in students' ease with co-construction: "definitely not ethnicity … the class I had last year was 100% Māori and … some of the kids in there took to it easily and some didn't, and likewise gender" (Rae, II, p. 14). (Jack. FI, pp. 11-12; Joy, FI, p. 11; Kate, FI, p. 12). One teacher, however, considered the language and personal skills required to initiate dialogue with a teacher as more likely to be female attributes (Roy, II, pp. 40-42). One teacher considered gender a factor in group work in her class. In her opinion, all-girl groups worked more effectively than all-boy groups (Rae, 21/10, pp. 1-2). Two other observations related to the difficulties of trying to keep the learning experience positive for low ability students (Joy, FI, p. 11; Rae, FI, p. 15).

Working with others in groups requires particular skills of students and also teachers. As an environment for learning, the atmosphere provided by group work can vary tremendously. In Stage Three, the manageability and validity of group work was raised by two teachers (Rae, FI, p. 11; Sam, FI, p. 5). Prior to this, issues arose related to students working in groups, which covered a wide range of potential concerns, which could impact on a teacher's desire to co-construct. Some teachers might feel quite daunted at moving to group work with secondary students: "trying to organize bigger kids into groups … which you associate with smaller kids, can be intimidatory" (Tom, FI, p. 32). Other disincentives raised included achieving optimal group composition (Rae, 28/10, p. 1; FI, p. 14; Joy, 23/10, p. 1; 5/3, p. 1; Kate, FI, p. 7); classroom noise (Joy, 28/10, p. 3; 11/11, p. 6); optimal group size; teacher stress (Joy, 30/6, p. 6); dishonest evaluation of learning and effort by students (Roy, II, p. 19; Joan, 18/6. p. 11; Joy, 12/9, pp. 6-7); slow pace; poor student behaviour (Joan, 2/7, p. 1; Rae, 19/6, p. 3; 15/3, p. 3; Kate, 23/10, p. 3; Joy, 5/3, p. 7); accommodating time variation (Rae, 21/10, p. 4); ensuring an on-task focus (Rae, FI, p. 11); and suitability for bright students (Jack, II, p. 7).

Work habits within a group can pose problems for other students as well as the teacher. Both teachers and students mentioned disproportionate efforts between group members and lack of co-operation as concerns: "Everyone's abilities are so different … some people are more motivated to learn than other people and therefore it doesn't often click. There'll be the kids that'll go, no let's not bother … and one person does all the work"(Jackss, 6/11, pp. 8-10). (Raess, 28/10, p. 3; Tomss, 8/3, pp. 2-5). Indeed, students sometimes asked to return to individual work (Joy, II, p. 6; Rae, 12/9, p. 1).

Some students (Jackss, 6/11, pp. 8-10) and several teachers raised the issue of the efficacy of students as teachers (Joan, II, pp. 16 & 18; Rae, II, p. 7) and the quality of learning that resulted (see also Chapter 4: 4.1.1). Sometimes, despite understanding the concepts, students do not necessarily find instructions easy to follow or explanation easy (Rae, 21/10, p. 3; Tom, 8/3, p. 2). Also, students may not be supportive of each other (Raess, 12/9, p. 2; Tom, FI, p. 18), or listen to each other (Tom, II, p. 14; Rae, 5/3, pp. 2-3).

Two teachers described how group work can be unpredictable, using the example of the variation in engagement between year groups given the same strategy and similar teacher input (Joy, 12/9, p. 6; Rae, 5/3, pp. 2-3). For the occasional student, groups have not been a safe environment in the past and one way they can help ensure their own safety is by refusing to work in groups (Tom, FI, p. 17).

That students need training to work more effectively in groups was a recurrent point (Tom, II, p. 14). If no attempt is made to develop the basics of working in groups with a class, the result can be less than desirable:

> I probably haven't really … done any work to develop a strong group ethos … amongst them…. I'm just sort of trying to chuck them into doing group activities without actually getting them to understand what it means to work as a group. (Rae, 5/3, pp. 2-3)

The numerous potential difficulties of group work can constrain teachers. Groups seldom respond consistently; neither do classes.

Classes are diverse: different combinations of people work together differently, producing a distinctive atmosphere and social climate. Teachers respond to the class as a whole, as well as to individuals and groups within a class. The previous two sections noted how individuals and groups can impact on the working environment of a class. Likewise, a strategy that works perfectly with one class may fail dismally with another (Joy, FI, p. 16).

The diversity between classes became an important theme in the new year in particular. Here the focus was particularly the variation between the current new class and the previous year's classes the teacher had taught (Joy, II, p. 6). "It was never as difficult with last year's 3rd form [Y9] as it is with this year's 3rd form. They were a really good bunch last year and so they would always try" (Rae, FI, p. 12).

> With my class last year there would be some really brilliant things happening … they were a lot more responsive … part of it was possibly the maturity level, but also they were a lot more attentive and a lot more open to trying different things and they definitely loved having a change from just doing normal textbook work. (Rae, FI, p. 12)

The issues raised were important elements to a teacher feeling able to co-construct, and centred on developing a learning environment built on foundations of trust. Being able to trust students was tightly interwoven with the teacher feeling in control of the class (see 5.3.1.1).

These perceived variations in classes can deter a teacher from attempting to co-construct especially when starting out at the beginning of the year with a new class. The four teachers who continued in Stage Three felt strongly that the expected class learning environment needed to be well established before a teacher could trust a class to co-construct. Termed "the control issue" by one (Rae, FI, p. 3), it was explained as "just getting my routines established and settled, so the co-construction can come a little bit later" (Tom, 8/3, p. 1). This idea was reiterated again and again:

> I feel that I have to get the culture of the class right first and that's why today … I was trying to modify some of their silly behaviours. I wouldn't really trust myself or them to co-construct anything until they're actually thinking that, yes they understand that they have to do a certain level of work. (Sam, 8/3, p. 4)

Time was needed to establish routines and the relationship with the class to develop the learning environment wanted: "it takes six weeks or more" (Joy, 11/11, p. 6); "time with the kids establishing the relationship such that we can be comfortable to try different things and them understanding my expectations about equipment and homework … just the real mundane things, the basic stuff" (Tom, 8/3, pp. 6-7). (Sam, 8/3, p. 3).

Students' attitude was a potentially important factor: "the kids themselves, if they were a particularly unhelpful bunch who didn't want to come forward and co-construct, I would be in trouble" (Joy, 6/11, p. 6). Another found the limited written communication skills of Y9 students a deterrent to written evaluation of their programme (Joan, 18/6, p. 13).

The range of abilities within certain classes can deter co-construction for some teachers: "But that's the other thing in this particular class, the range is huge…. That's a major issue" (Tom, II, p. 15). (Rae, 5/3, p. 2). The range might cover work habits as well as prior learning and ability (Tom, 8/3, p. 1). The coordination of the different needs of individuals, groups and the whole class can prove problematic (Tom, 28/10, p. 2).

The uniqueness of classes provides another layer of complexity along with group and individual difference for teachers to navigate. Together these potentially considerable variations in personality and relationship can compound to limit innovation. Other issues related to the work climate of teachers can constrain them further.

5.3.1.3 Teachers' work issues (external pressures)

Issues related to teachers' work impinged on their attitude and desire to co-construct with their classes. These included time, school structure, and curriculum

constraints. Time was a major determinant for many teachers in their development of new practice. They reported a range of demands including reflection and planning, resource preparation, and the busyness of the school working environment. The fulltime teachers unanimously expressed concerns over inadequate time to reflect, plan and prepare for classes given teaching loads they viewed as heavy (Sam, II, pp. 17-18). They expressed the need for life balance (Sam, FI, p. 27; Kate, FI, p. 16): "There's only x amount of hours in a day and I don't want to be a teacher 24 hours a day. I've got a family of my own" (Tom, II, pp. 16-17). An area of strong agreement was that the uncertainty which co-construction brings, with the starting point and pathway possibly determined with students, means more planning than normal to be able to divert as needed:

> Have I got the right things planned? Or what am I going to do if the kids suggest something that I've got to respond to? Can I lay my hands on them? Or am I in a position to? Because if you do throw over some control of the kids they're going to come up with the odd curved ball. But, so that's just in the back of your mind. What might happen unexpectedly? (Tom, FI, p. 13) (Also conveyed by Sam, FI, p. 4 & 27; Jack, 4 & 6/11, p. 5; FI, p. 7 & 13; Tom, FI, p. 22; Kate, FI, pp. 3 & 13.)

There was unanimity among teachers that introducing new strategies requires considerably more time in planning and preparation than "tried and true transmission models" (Jack, II, p. 8) - teaching as usual (Jack, II, p. 10; Kate, II, p. 10; FI, p. 7; Joan, II, p. 5; Sam, FI, p. 33).

Time to make resources to meet pedagogical needs was nominated as a potential constraint. Such resources were wholly developed by the teachers - they had no resource assistants (Jack, II, p. 10; Kate, FI, p. 10). One teacher remarked that the decision to co-construct can require a lot of work by the teacher in order to keep their credibility with students. For example, being able to respond to students' requests can require resources such as games (Rae, II, p. 10; Tom, II, p. 17) and the results are not assured, varying from disastrous to successful (Rae, FI, p. 24; Sam, 21/10, p. 2).

The busyness of schools was reported by most teachers as an important reason for the dearth of time to think and prepare for teaching. The immediate concerns that fill up a teaching day can take considerable time and energy:

> Sometimes you get so fuzzed up with why is this student not working … that person's been away a lot, that person hasn't sat the test yet … with all the sort of stuff that just goes on that you've got to deal with … those irritating things. (Kate, II, p. 10)

The range of other tasks that impinged was lengthy and included administrative tasks such as report writing (Tom, FI, p. 22); having a student teacher (Tom, 6/11, p. 3); prize giving (Tom 6/11, p. 3); and major professional development programmes (Sam, FI, p. 29). Besides teaching, those teachers with other management roles, such as Deans and HODs, had very many calls on their time related to these roles (Sam, 21/10, p. 5; Tom, 6/11, p. 4; Jack 23/10, pp. 3-4; FI, p. 1).

Certain aspects of school functioning were reported by particular teachers as having impacts on their classroom programme and hence their implementation of co-construction. These included co-curricular programmes (Sam, FI, p. 26; Rae, 5/3, p. 3; Roy, 26/6, p. 12); timetabling (Roy, II, p. 4 & 34); class sizes (Kate, FI, p. 8: Sam, FI, p. 20); the physical environment of the classroom (Kate, FI, pp. 8-9); and administrative and organisational difficulties (Roy, II, p. 27).

Major constraints to co-construction of content of the classroom curriculum were explained by the teachers. Content is very prescribed by various layers of requirements and regulations at the school and national levels (and sometimes international) so this area was largely precluded as a possibility for co-construction with students. The major regulators were the national curriculum, the school subject department's approach to coverage of this, and qualifications, which were mainly driven by NCEA, and its unit standards and achievement standards.

The over stuffing of the curriculum with topics, the "crammed curriculum" (Sam, 27/6, p. 6), was probably an element in the high anxiety all teachers displayed

over curriculum coverage and time: "It's like the curriculum constraints and time constraints … that's what's … constantly in the back of my mind when I'm planning my lessons, is how much time I've got for something and what I need to cover" (Rae, II, p. 10). (Joy, 17/6, p. 2). Also, it was suggested that the spiral format of the curriculum: "Maths is cyclical - you start at five and gather things up as you go up the tornado", could be reviewed in light of the pedagogical experience of other systems in various overseas countries (Joy, 6/11. p. 3) to give more flexibility in content coverage.

The lack of relevance flavoured some students' response to maths, despite teachers' efforts to make links by finding a real life illustration. Students in one junior class (Raess, 11/11, pp. 3-4) had said that they wanted common sense stuff, which would be needed in their future careers.

Perhaps the most pervasive constraint to co-construction of content was the influence of NCEA over even the junior levels of the secondary subject curriculum in regard to topics and assessment formats (Joy, 11/11, p. 8). All the junior teachers acknowledged there was little flexibility in their Y9 and Y10 curricula because of their choice not to disadvantage potential NCEA students (Rae, FI, p. 21; Joy, FI, p. 6).

What seemed to be restricting teachers' pedagogies at Y11-13 levels were the responsibilities of teaching to the qualification, concerns of time, coverage and the very specific assessments utilised: "I'm a lot more conscious of the curriculum in senior classes … I think it's a time, it's a curriculum demand, so exam, assessment-focused" (Tom, FI, pp. 19 & 26), particularly with the greater focus than in the former qualification system on internal assessment: "even more so now, prescription based, now I've got exams everywhere. Your timelines are really short, and sometimes you just have to say, you better move on" (Sam, II, p. 10). (Joy, II, p. 5). One teacher felt that the pressure on teachers to get conversant and confident with NCEA, because of its importance to students, puts their focus on it to the detriment of other aspects of their teaching (Joan, II, p. 20).

To get students through the qualification, teachers admitted to teaching very specifically to the assessments (Joy, II, p. 19; Jack, II, p. 6 & 7), which were very precise: "very, very cut and dried and … the means of assessment … pretty much a straight-jacket" (Tom, II, p. 21); "tightly controlled tasks (p. 11) … like little sausage factories able to turn out the same, some a bit better than others" (Roy, II, p. 37). They felt very pressured for time: "I'm so pushed to get through what we need to get through at the moment … each period is precious" (Rae, II, p. 4). One teacher expressed a concern that NCEA was leading to greater conformity through the strictures of the assessments, an idea perceived as in opposition to co-construction (Roy, II, pp. 8 & 11).

The overwhelming range of potential constraints covered in this section helps portray, though inadequately, the complexity of the pedagogical endeavour. That teachers could rebound from these and still maintain their efforts to co-construct demonstrates the many positives they attributed to it and their resilience. The following section considers important points raised by these findings.

5.3.2 Discussion: The potential constraints

This section takes up several important points from the explanations of the numerous potential constraints which can impede the development of co-constructive pedagogy in a secondary context. Current literature of social-constructivism provides a helpful source of comparison for the findings and a solace that others have encountered problems; or suggests potential solutions. The issues to be discussed are ideological and practical concerns about co-construction, the diversity of personnel and the current secondary context.

Ideological and practical concerns

A bewildering assortment of potential constraints to implementing co-construction were identified. They were broadly based, covering most aspects of the ideological, practical, psychological, personal, contextual, and social aspects of the teaching-learning endeavour in a secondary school. The sheer number and range of concerns voiced could overwhelm. However, perhaps it indicates the very experienced nature of both sets of participants. Teachers know and can

explain the complexity of their work. Indeed, to preempt many difficulties they need to have thought about them and developed practices so they do not eventuate or dominate. Students also, have many years of enculturation in the ways of schools.

Ideological concerns about co-construction are not surprising. Thirty years ago the "dominant teaching technique was transmission of knowledge" (McInerney, 2005, p. 592). Although since that time constructivism has "dented" ideas about knowledge and how learning takes place, the combined strength of teachers' experience, practice, success and the hegemony of transmission as effective teaching, is sustaining. Researchers often acknowledge the lack of uptake of constructivist practices in classrooms across western countries (Airasian & Walsh, 1997; Bishop, Berryman, Cavanagh et al., 2007; Good & Brophy, 2003, 2008; McInerney, 2005). Reasons for this are replicated in some of the findings of this study: some pertain to any classroom innovation, others relate specifically to co-construction. They include, for example: inadequate training and expertise; confusion about what the pedagogy is; under resourcing; accountability constraints (McInerney, 2005); teacher socialisation overriding teacher education (Klein, 2001); teacher subject knowledge; the more demanding student roles involved; insufficient scaffolding of activities for groups or individuals (Good & Brophy, 2003); time issues - to learn new ways and roles; and curriculum coverage needs versus depth (Airasian & Walsh, 1997; Good & Brophy, 2003). The variance between the seductive rhetoric and reality has been noted: "the image of a community of learners co-constructing understandings through sustained dialogue is very appealing, but bringing it to life in the classroom can be difficult for many teachers" (Good & Brophy, 2003, p. 454).

Furthermore, by secondary age students are well rehearsed in the ways of a classroom and can have much good sense to impart. From their experience they can explain their own preferences, the foibles of various strategies that might be used, and the vagaries of their peers in classroom work. For example, senior students' critique of a use of jigsaw shows discernment. Their learning was clearly impaired, however the problem could have been easily fixed with an initial

base lesson on the topic, as they suggested. Not surprisingly, Good and Brophy (2008) make the same suggestion for similar circumstances. Likewise, students acknowledged that often there are no simple solutions for group difficulties, showing awareness of the complexity of the social dynamics of the situation. However, in contrast students can enjoy the stability of a strongly teacher-directed workplace. They can demand more of the old way, more instruction and notes - what Fielding (2004b, p. 308) terms "regressive pedagogy".

Many concerns about group work are featured in the literature (Good & Brophy, 2008; Hunter, Gambell & Randhawa, 2005; Nuthall, 2002; Sewell & St George, 2008); for example, the non-participation of some students, the subordination of learning agendas by social issues, and sustained exposure to misconceptions. So their occurrence in this context will provide further credence to the need to be aware of such difficulties. Other issues noted by participants included manageability, optimal size and composition, noise, slow pace, variable engagement, and the need for training to function effectively. Recent Canadian research (Hunter et al., 2005) has found gender gaps in group listening and speaking. Interestingly, this is in accord with Rae's observation that her all-girls groups worked more effectively than all-boys.

The aforementioned issues with group processes illuminate others related to selling the democratic process (Beane, 1997, 2005; Dewey, 1966) to students who have learned to be somewhat resistant or who would rather not expend the effort. There are also issues around the arguments of engagement and commitment when students are given the opportunity for input. Unfortunately, having such opportunities does not always provide the envisaged result. Co-construction is not a magical panacea.

As the previous discussion illustrates, the tensions and difficulties in co-constructing have considerable coverage in the literature. However, it is unusual to find reference to preconditions for co-constructing. The unanimity about the need for classroom control (management) of those teachers who continued in Stage Three was surprising to me. All were very experienced teachers whose

classrooms as observed in Stages One and Two the previous year, in terms 2-4, were well managed, vital, provided a sound learning environment, high levels of safety and intellectual challenge for students, and overall exemplifying excellent student-teacher and student-student relationships. Classroom control was not mentioned. The contrast in Stage Three with new classes does suggest that one should not underestimate the time and effort that is expended by such teachers in developing a trusting relationship and quality learning environment in the first term of a year. They did not have the confidence to begin a class with co-construction right from the first encounter. Instead, they reverted to their habitual methods and gradually introduced strategies that led to a more co-constructive environment. In contrast to their viewpoint and practice, examples can be found in the literature of other research (e.g., Beane, 1997, 2005) which suggest to start as you mean to continue.

Sewell and St George's (2008) recent summation of the tensions and constraints in developing classrooms as a community of learners harmonises with many of the issues raised in this study. They note issues with student teacher relationships; the need for guidance for students to change their customary ways of interacting in the classroom; the need to cope with differences of opinion without rancour; the potential of too much conformity; that increased empathy for diversity may lower expectations of academic performance; and the impact of class size and time together on the development of the sense of community and relationships. They also note the difficulties for teachers in understanding a sociocultural approach, the specialised content and pedagogical knowledge required to cope with the unpredictability; the pressures of curriculum coverage and standardised assessments; and the promise of better learning from collaboration and dialogue not being achieved. They warn of the dangers of "straying from intended goals and content … erratic progress and developing misconceptions" (2008, p. 216).

Diversity

The diversity of school populations has always been a given (gender, culture, SES, and ability). However, in recent decades mainstreaming and highlighting of the achievement of different cultural groups has enhanced the focus. The

uniqueness of the individual learner is one focus teachers have always maintained alongside their need to function with groups and large classes (30+ students). The juggling of focus from class to individual to group needs is an important facet of teacher practice. Diminishing class size was one aspect suggested by two of the teachers to help improve their differentiation of the learning programme to meet the needs of individuals. There is also an obvious conflict between a pedagogy which to a degree utilises cooperative groups for learning, and the individual, still competitive, nature of assessment in senior school. This epitomises the conflict in society between the New Right view of education as an individual personal benefit (Fielding, 2004a; O'Neill, 1996/7; O'Neill, Clark & Openshaw, 2004), developing a self-interested consumer, rather than it being framed more widely as a collective benefit necessary to society and democratic suffrage. The policies of the New Right have underscored many of the changes in education in the 1990s, such as the *Curriculum Framework*, student loans, and the competitive market model of schooling.

The suggested links between personality and pedagogy are interesting. Some students and teachers seemed to fit a co-constructive pedagogy better than others. Do teachers intending to co-construct need to have traits such as preparedness to take risks and be innovative, flexibility of thinking, quickness to respond to student needs, and willingness to move from the intended plan? Some researchers would put considerable weight on such teacher attributes as necessary to developing the envisaged classroom (Waldron, 2006). Research in New Zealand by Massey University, *Perceptions of Teachers and Teaching* (Kane & Mallon, 2006), and that of Hattie (2003) on expert teachers, stress similar characteristics. As to whether these attributes are able to be developed effectively through initial teacher education programmes seems an area beset with difficulties (Klein, 2001; Korthagen & Kessels, 1999). It is interesting to note the alignment of the traits listed above with Hattie's descriptions of expert teachers; for example, expert teachers tailor teaching to fit the context by being able to "anticipate, plan and improvise as required" (2003, p. 6). Such attributes seem to combine personality traits, self efficacy and experience. A teacher needs to be thoroughly prepared for the many possible contingencies in where a lesson might go and willing to endure

uncertainty. They need a broad pedagogical repertoire which can be utilised in innovative ways in the moment of the lesson. Such requirements suggest a need for ongoing inservice teacher education. The importance of pedagogical content knowledge and subject knowledge was clearly demonstrated by the teachers' experience of co-constructing in this study. This provides more evidence to this aspect of a contested area (see Chapter 2: 2.3).

The secondary context

The secondary school context does constrict the development of co-construction. Transmission has a traditionally stronger traction in secondary in contrast with a primary system which for decades has promoted child-centred approaches (Aikin, 1994; Bishop et al., 2003). The strong subject orientation of secondary schools continues. The known/traditional provides safety for teachers and students (e.g., anxiety of senior students about qualifications) in times of continuing change in curriculum, qualifications, and assessment practices. Over the past two decades since the Tomorrow's Schools reforms of 1988, this has been the educational menu. Maintaining or establishing pedagogical change, as promoted by *Mathematics in the NZCF* (MOE, 1992), has been shown to be especially vulnerable to the pressures of school working conditions- their complexity, busyness and unpredictability.

Other constraints particularly related to the secondary context are the seeming inflexibility of the subject curriculum; NCEA's influence over coverage in the junior years; the anxiety of preparing students fairly for Y11 and rigidity of subject programmes because of this; and the maintenance of industrial structures to cope with the mass of students such as timetable, bells, and movement to class.

Adolescent students may not be as biddable as primary children. Certainly those in senior classes have an interest in gaining qualifications which brings greater pressures to the learning context. Students are not submissive recipients of pedagogy, despite the way their role is frequently depicted in descriptions both by themselves and others (for example as being "spoonfed"). Their response to, interaction with, and relationship with the teacher and each other in the classroom,

plays a huge part in the smooth implementation of new pedagogies. Most are well trained in transmission, competition and an individualistic approach to learning, and alterations to such a norm, as exemplified in the reactions described could prove worrying for some of them. Loughran and Northfield (1996) provide similar examples of student discomfort at the contrast with passive approaches to learning.

However, there are aspects about the way transmission is slated that need querying. To view the student role in transmission as passive is a misnomer. A student can be actively thinking and learning, though may show no physical signs of attention and action. Also, is the pedagogy in secondary schools quite so simplistic as the stereotypical description of transmission? I would suggest that teachers use a range of strategies to provide interest and variety which are far from the "teacher out the front" caricature. However, in doing this they may act from a transmission rather than a co-constructive epistemological perspective.

Students come with baggage related to subjects, learning, attitudes to school, and life experiences which can impinge on their classroom life. "Staunch" students and the egotistical were described as particularly difficult for teachers. There might be a slight condescension in teachers' perceptions of students, in the surprise that was sometimes expressed when students did suggest ideas that were aligned with the teacher's own, or were appropriate. Societal discourse seldom positions adolescents as sensible and responsible, and this may impact on teachers' perceptions of their students.

Deficit theory (Bishop et al., 2003) as defined by *Te Kōtahitanga* was sometimes queried by the teachers as it was counter to their perception of students. In fact, some felt that to develop a relationship with a student it was important that a teacher show sensitivity and knowledge of their life beyond school and how that might impact on their learning. Students, like teachers, have their comfort zones, and it takes time, practice and sound reasons to support their learning of new ways of being in the classroom. Learning new ways was needed for individuals,

group practices and classes, and required structured, supported, repeated introduction, instruction and development.

The issues above elaborated areas which may need addressing that potentially complicate co-construction in a secondary context. In spite of these complications there was a great deal of enthusiasm among teachers and students to persevere with the possibilities a co-constructive classroom approach offered. The following section presents findings that explain why, despite such diverse issues, teachers and many students still wished to co-construct.

5.4 Why co-construct?

5.4.1 Findings

The previous theme detailed what the participants reported as numerous potential constraints to co-constructing. This section explains why, in spite of these, teachers and many students wanted to co-construct. The reasons are explained in relation to the perceived benefits for students, then teachers. The teachers' views are taken mainly from the initial and final interviews and overall show a firming in their opinions. The students' views come from all three stages.

5.4.1.1 Benefits for students

For all the teachers the overriding reason for co-construction was because they felt it benefited their students:

> Because of the kids. It's good for the kids. It makes my life easier. They are much more responsive, receptive, they're easier to get on task, they're enjoying, he said hopefully, what they're doing, and it's interesting (p. 16). It's … student-centred. And that's the core. That's why you're there. (Tom, FI, p. 31)

Most teachers came to understand co-construction as an essential way of building the relationship with students. They echoed Roy's explanation of it as the enactment of a respectful relationship: "it's being a nice person, it is a way of dealing with human relationships … you're not ramming stuff down people's

throats … it is quite a simple idea: It's how I want to be treated … as a person" (Roy, II, p. 13).

The fostering of quality relationships between teacher and students, and between students themselves, was an essential basis for a high calibre learning environment. Most teachers felt that students and the teacher came to a better understanding of each other: "co-construction to me is all about that relationship with the kids … you're allowing a mature relationship to grow between teachers and kids" (Sam, FI, p. 24). "A really good rapport within the class, making everyone, and that includes the teacher, feel good about coming, feeling happy about being in that room … there's not … the power struggle between students and teachers. It's more of a cooperative environment" (Kate, FI, p. 4). "Working as a team" was the description used by several teachers and students of such class relationships (Tom, FI, p. 24; Kate, FI, p. 3). Communication included pastoral issues, seen as having positive spin-offs for the learning relationship (Kate, Joan, Sam, Joy).

To develop such relationships required the teacher to value, access, attend to and facilitate students' contributions to the classroom curriculum, developing more of a partnership: "co-construction is about getting input from other people at whatever level we want to … rather than just spoon-feeding kids" (Sam, FI, p. 1).

> The major thing … is the kids, hearing the kids, that would be one of the things that stand out for me about co-construction. It's hearing the kids, allowing them to either make decisions or have their say, or contribute to some aspect of the way things are run in the classroom … probably also a lot more working with each other, perhaps group work, pairs work and that sort of thing…. There's a bit more sharing going on. (Rae, FI, p. 3)

Students often corroborated teachers' positive feelings about their part in co-constructing. Descriptions included that it made students "feel special" (Joanss, 18/6, p. 3); "important' (Royss, 26/6, p. 2); "cool" (Tomss, 17/9, p. 1); "it's good to be listened to" (Jackss, 6/11, p. 3); "it's nice not to be just told" (Royss, 26/6, p. 2); "It's cool, because you get to have your say, to say what happens…. Come up with your own things yes…. Your way of doing stuff, not his" (Tomss, 17/9, p.

1); that taking note of your evaluations of teaching methods and programme showed the teacher values your input: "takes you seriously" (Jackss, 6/11, p. 17). Some seniors expressed their comfort with a teacher who was "more on our wavelength, relaxed … with a sense of humour … it's like the teacher sees you more as an equal or they need to see you more as an equal for you to learn". At their age they knew how to respect others and listen to them, and asked that teachers be responsive to what students want in pacing and flexibility to move from the plan (Eve & Alice, 19/3, pp. 17-27).

The benefits for students' learning reported by teachers and students included developing ownership, responsibility, engagement, active participation, motivation and control. Ownership of learning was a common way teachers explained the advantages of co-construction for students: "it is a really strong thing … that ownership thing. They take ownership of their own learning because of it" (Roy, II, p. 31). "It's allowing the kids to have input into what happens in the classroom, allowing them to have a voice, maybe being a part of the decision-making" (Rae, FI, p. 1). Examples of co-constructed classroom rules were often used to explain why teachers believed ownership had traction for classes (Sam, II, p. 14; Jack, FI. p. 6). Some students also mentioned developing rules: "it's like just to treat each other how you'd like to be treated and that stuff.… It's done like a treaty" (Raess, 28/10, p. 6). On one occasion two students expressed the impact of owning their learning as "He makes us feel more comfortable /Like we participate more /Not normal boring maths … it's not sit down, be quiet and listen. It's ours!" (Tomss, 18/10, p. 4).

Teachers used ownership synonymously with responsibility (Jack FI, p. 2; Joy, FI, p. 4). The explanations of its strengths included autonomy: "Success. Acknowledgement. Positive. I think along the lines of internal satisfaction through self-determination … they feel good about making their own choices" (Tom, FI, p. 18).

> That feeling of ownership comes with a degree of respect, and so therefore the classes … allowed to have some ownership in some area, can be more respectful of a classroom and also … some of that peer pressure can work more effectively. (Joan, II, p. 12)

One group of students involved in deciding how a demonstration lesson for RTLBs would be structured described their input and its commensurate responsibility: "We just decided … how we wanted to do things…. Whether to do those activities in groups or like together or individually." They acknowledged: "it would be a bit upsetting if it doesn't work" (Tomss, 17/9, p. 1), as they had decided the method. Another example involved the negotiation of the timing of a test with students. Their reaction was this gave them "time to revise … and revive…. Cause it's our responsibility to do that extra effort, it's all up to us whether we pass or not" (Tomss, 28/10, p. 3).

Closely implicated with student ownership and responsibility was improved engagement, participation, and motivation, in comparison with the strongly teacher-directed classroom: "… definitely an improvement in engagement. That's my key one … I've seen that already" (Tom, II, p. 15). (Kate, II, p. 7). "I still think that student ownership drives them a lot more than the teacher direction" (Joan, II, p. 12).

> I like getting feedback from the kids. I like them to feel that they can have some say in what they're doing so that hopefully that will give them a bit more motivation, a bit more interest in what's happening. (Rae, II, p. 7) (Jack, II, p.8; Sam, II, p. 14)

Participation required an active, dynamic learner who pursued ideas: "interact with one another, ask questions, and build on their knowledge that they have with one another in groups in which they can feel comfortable about sharing their knowledge…." (Jack, FI, p. 2); showed initiative: "a much more proactive role" (Jack, FI, p. 12); and thought for themselves: "getting them to be more used to the processes of finding ideas for themselves … we're all going to have a participation in it" (Joy, FI, p. 20). "I'm trying to make them think through it themselves" (Sam, FI, p. 18). (Jack, FI, p. 9). The changed expectations of students emphasised their essential active role in learning and in contributing to the classroom:

> Make some decisions for themselves. Don't wait to be spoonfed by me. Get used to the fact that I'm not often going to give them the answer, that I might give them clues to the answer or provide the resources or the learning that they need to get the answer, but I'm

> not going to tell them if I can avoid it. Get out of that mindset, so they give me the answers, they're contributing and that they're participating and that they're engaged. (Tom, FI, p. 5)

When teachers and students co-constructed the classroom curriculum, students had power and more control of their learning: "get that relationship going, give them the power to be in control of their own learning" (Sam, FI, p. 34). They can utilise this: "They can learn another step" (Tom, II, p. 15). They are able to request precisely the next step needed for their learning, filling the gap – a formulaic description of feed-forward (Sadler, 1989). This emphasises how formative assessment is entwined in co-constructive pedagogy and the partnership between student and teacher:

> more responsibility about their learning and greater understanding of what's happening … that interaction between myself and the student is at a plane where it is not teacher and student any longer, but we've got someone there who wants to extract information from you and I think the question becomes a lot more sound. And they become more critical … about what they're doing and what questions they want to ask, because they know specifically what they're doing rather than saying how do you do this, they will say to you I have got to this point, see where I need to get to that point, but I'm not sure how to move and get that gap covered, and I think it then shows that they have taken responsibility and learnt for themselves to assert their point. (Jack, II, p. 9)

Students also noted the importance of feeling able to initiate and ask questions of the teacher which relate to their learning needs: "I ask more questions than most people because I find if I actually ask them and they tell me … like straight to me, then I get it" (Mary, 19/3, p. 3). (Eve & Alice, 19/3, p. 22; Joyss, 5/3, p. 4).

The idea of control appeared in some student views: "cause if you don't have any control at all you feel a bit cornered … and when you have no control you always rebel against it. It's natural" (Samss, 4/11, pp. 2-3). Having some control brought greater relevance and hence involvement: "I guess we're more attentive to it because it is related more to us" (Samss, 4/11, p. 1). Both junior and senior students reiterated this view when saying that their own questions and topic choices worked better than the teacher's: "Like if you choose it, you know it's going to be exciting. If she chooses it, you might not be bothered doing it.

Because the teacher don't [sic] know what you are interested in" (Joanss, 18/6, p. 6). "We just take over our own learning" (Mary, 19/3, p. 6). (Joyss, 15/3, p. 4; 5/3, p. 2). However, often senior students noted that when a teacher uses real-life examples this enhances relevance (Alice & Eve, 19/3, p. 2).

Most teacher participants had begun the study expecting that co-construction would enhance learning, and improve student achievement: "Oh I think ownership will allow them to improve their learning. If they're sitting there saying I was part of the decision to do it this way, I think they are in a much more positive frame of mind to be learning something" (Sam, II, p. 14). "I am hoping that their achievement will come up" (Joy, II, p. 11). "I would like to believe yes" (Roy, II, p. 45).

These viewpoints had not changed by the final interviews; the conditional and tentative note remained in their statements: "the more that you can actively involve your students the more success that you're *probably* going to have" [emphasis added] (Jack, FI, p. 13).

> I would *like to think it does*. I would like to think it engages learners more and therefore if you've got better-engaged learners the outcomes and terms of that learning should in fact be better… but I would be confident enough to think that if you can get students interested in what they're doing, then you are more than likely to have success in terms of their achievements, for sure. No doubt. (Jack, FI, p. 21)

> I *hope it does*. I don't know if it does or not. It seems to work well because I think when the kids are sharing with each other and helping each other or learning from each other, I hope that it means that they're actually learning things a lot better. (Rae, FI, p. 23) (Joy, FI, p. 24)

The teachers conformed to the common call for evidence from quantitative sources such as summative tests: "I'm sure it improves their learning, but I can't qualify that or quantify that at this stage" (Kate, FI, p. 21); "I need some better test marks" (Tom, FI, p. 29); "I haven't necessarily got data to say to me that that is the case" (Jack FI, p. 21); "I think we need to do a bit more investigation on that" (Joy, FI, p. 24); "I would have to do a survey. I would have to get some

results … so that's where it's difficult (Joan, II, p. 13). However, the difficulty of isolating co-construction as the important variable in the absence of a control group was recognised: "I suppose, because in a sense that it's just my style in some cases, it's really hard to say whether their results are a reflection of that or a reflection of some other reason" (Joan, II, p. 13).

> My 3rd form class … I remember being quite rapt with the results that they got throughout the year in tests and stuff like that. But I don't know if it would have been the same if we hadn't done it. (Rae, FI, p. 23)

However, all teachers then supplied evidence from their classroom experiences which provided rich data to support their personal judgments of the efficacy of co-construction. Some supporting reasons included improved engagement levels, confidence as learners, and more students choosing to continue with NCEA maths:

> I know in my heart of hearts it improves their engagement levels. I can't see how a kid who's engaged isn't performing something more than if they were not engaged. And whether or not that transmits itself into better results or just a better feeling of self worth and value, it's got to be good … you get asked this question a lot, and the only thing I can be 100% sure about, because I've seen the data, is the engagement level … we have definitely raised the kids' engagement levels, and you've got to hope that there is a spin-off. The other spin-off … is when the kids get to the point of entering senior school and making choices, what sort of choices are they making? Are they choosing to do the alternative programme or are they choosing to go to NCEA? And I think that's another indicator of students' success. There are a number of kids from my year 10 last year who are in NCEA classes … a number of them who are struggling … but to my way of thinking they are way better off attempting at that level than accepting an easier path. And they've made what I would call the right choice … the kids have done it themselves. (Tom, FI, p. 29)

Other evidence was that students were able to explain what they had learnt: "they can usually tell me on any one day if I've just taught them something or they've taught each other something, that they know how to do it" (Joy, FI, p. 24); to teach and learn from each other: "The fact that they can explain and teach something to another kid, is one of them" (Rae, FI, p. 23); and were happy in their learning:

> It was really neat just to hear them, all these maths words and all this math talk coming out and all the teaching of each other and it's really great to hear … I really like it when I hear the kids teaching each other things … that's when I see that co-construction has value, when the kids are actually learning from each other and when they're happy. (Rae, FI, p. 12)

Another indicator was greater progress with learning and skills than anticipated given their starting point at the beginning of the year: "a lot of my kids have done really well in the tests … and if I compare it with their skills analysis at the beginning of the year, you know I wouldn't have thought they would have done as well" (Rae, II, p. 9).

Also, intrinsic motivation was more evident where students had some input:

> I've noticed with the overbearing teacher method … where everyone's doing what they're told … is that when the students go home and do all the good work, they haven't got their heart and soul in it, so they won't stay up to 2 o'clock in the morning, whereas the way I do it they do. (Roy, II, p. 45)

Students frequently concurred that motivation was raised when they had input, choice, or other control over aspects of their learning (Tomss, 19/6, p. 2; Joanss, 2/7, p. 4; Raess, 28/10, p. 3; Eve & Alice, 19/3, p. 4; Samss, 8/3, p. 2; M, 19/3, pp. 10 & 16): "It makes you want to learn, it makes you want to do it yourself, like … if I don't get it done … it comes back on me" (Eve, 19/3, p. 12); "once you figure out something that you want to do you get all excited" (Mary, 19/3, p. 5).

In co-construction the value of recognising and using fellow students as a major learning resource is emphasised. This message was reiterated frequently by both teachers and students: "The most effective learning is the interaction between the students themselves, with students and the teacher" (Jack, FI, p. 19). "Teach one another and recognise each other's prior learning, seeing their classmates as a resource instead of calling me over all the time. I firmly believe they're much better at listening to each other than listening to me sometimes" (Tom, II, p. 7). "I try each day to do something that will make them do the teaching and do the

learning themselves rather than being directed by me" (Joy, FI, p. 1). (Jack, II, p. 9; FI, p. 5; Tom, FI, p. 19).

Students also frequently recognised that they learn from each other (Katess, 23/10, p. 2; Joyss, 12/9, p. 3; Raess, 11/11, p. 2). The positives of peer teaching were competently summarized by two senior students:

> … someone else could be thinking … from a different way and see it a lot more clearly and explain it to you because they're on your wavelength (p. 3) … you're same age, same ideas … same examples … a nod of the head is sometimes all we've got. Our own language … we don't use really big words. We … explain in simple English …. If we get something and someone else doesn't, it's easier to explain it than a teacher … if we've just learnt it that year too, we know how frustrating it is not to be able to get it, and then when you get it, it's like, "Yeh!"
>
> And then you want to teach other people because you want to help. And it also brings you to a deeper understanding of what you're learning … by having to explain it to other people. (Alice & Eve, 19/3, pp. 13-14)

There were numerous positive comments about group work of which these were representative: "everyone gets a turn- if you don't know something they can help you, and if they don't know something you can help them" (Joyss, 12/9, p. 5); "you can bounce ideas off people and work out the answer all together. Everyone thinks with one mind" (Alice & Eve, 19/3, p. 3). (Raess, 21/10, p. 3; 28/10, p. 2; 5/3, p. 2; Joyss, 23/10, p. 2; M, 19/3, p. 3ff; Alice & Eve, 19/3, pp. 3 & 5; Tomss, 8/3, p. 2).

Some teachers explained that students might demand co-construction, especially when they are used to operating in this way: "Probably the resistance would have been when they had to go back to doing textbook work or board work" (Rae, FI, p. 13). (Tom, 28/10, p. 3). "When they've found something that works for them … they are very, very quick to tell you, "That's cool. Can we do that again?" (Tom, FI, p. 19). Many junior students corroborated, they generally disliked copying material from the whiteboard or OHP, or books: "Besides they're not even teaching you, you just work out of the books there…. Learning like games

that teach about whatever we're learning about" (Katess, 23/10, p. 2). (Joyss, 11/11, p. 5).

Numerous examples were provided by teachers of students enjoying this way of working, which one described as "the happy factor" (Kate, FI, p. 1): "that class is going really well. I'm really enjoying that particular class, those kids. They seem really happy too, and I think a part of it is because they do get to have quite a lot of say in what they're doing" (Rae, FI, p. 3). "I just think kids enjoy interacting with each other and with me in the smaller group situation" (Tom, II, p. 22).

> If the kids are enjoying themselves, are turned on to the learning … then obviously the whole thing is a much nicer way of doing it. Their behaviour improves. If they're all on task, they're learning more, their results might go up one day, so yes, those are the benefits of it. (Joy, FI, p. 9) (Rae, FI, p. 2; Tom, FI, p. 24)

Students may even learn despite themselves. "Having fun while you're learning or perhaps learning without realizing it" (Kate, FI, p. 11). (Tom, FI, p. 18; Rae, FI, p. 12). Numerous times students substantiated such views that this was a "funner" way to learn (Raess, 27/6, p. 8). Other adjectives used included "cool" (Raess, 27/6, p. 1) and "exciting" (Joanss, 2/7, p. 4).

5.4.1.2 Teacher benefits

Teachers also benefitted from co-constructing, a powerful reason to continue their development of the approach. All the teachers professed a dislike of using only a traditional transmissive pedagogy. They strongly expressed the belief that it did not work satisfactorily: "I think it is boring. I don't know how effective it is for all the kids … I think a lot of it is down to, like for me … I don't want to be a chalk-n-talk teacher" (Rae, FI, p. 18).

> just because you stand up at the front and say, "Get on with it. Turn to page 26."…. If you wanted to you could sit down in front of the class and just bark comments at them, you know, "Be quiet, sit down." … you don't have to know what they're doing. You don't have to do anything.… That would be a very easy way of teaching if it worked, but it doesn't, so we don't do it. Or I don't do it … I have no idea what they're learning until you do an assessment and find out they've all failed. (Joy, FI, pp. 8-9) (Sam, FI, p. 4; Rae, FI, p. 8)

> It comes down to the belief that I hate spoon-feeding the kids and I hate it even more at that higher level even though it happens more…. Our 7th formers just think they should sit there and learn and soak something in, not realizing they have to actually do some of their own work. (Sam, FI, p. 5)

A co-constructive approach sets up greater sharing of the responsibility for the learning between teacher and learners: "in our department most people believe that it's actually the kids' responsibility to learn … it's pointless standing up there and preaching…. So that leads to a high expectation I think of the kids' part" (Sam, FI, pp. 32-33). It provides a vision of a good learning environment: "this fluffy, little classroom where everyone feels comfortable, safe and willing to learn" (Sam, FI, p. 5).

Teachers unanimously felt co-constructing improved their teaching: "It's a much more effective way … of teaching" (Tom, FI, p. 16).

> Co-construction is saying to people that you want to relate and that you don't know everything and you're also respecting their mana, and it's a world of difference. I think I'm being the best teacher I can when I'm using it. (Roy, II, p. 32)

Other supportive reasons were wide ranging including improved focus on planning and formative assessment: "Because it makes me concentrate more, and plan more and be nice. But I try to always feed-forward rather than feed-back … to couch the words I say in a better way" (Joy, FI, p. 25); greater enthusiasm and effort: "partly because it makes me more enthusiastic and I know that takes you a long way … I put a lot of work into it" (Rae, FI, pp. 22-24); and better preparation: "It's a lot more work basically with resources, building the resources … I think there's a bit more planning involved" (Tom, II, pp. 15 –16).

Many of the teachers found the spontaneity and unpredictable nature of the teaching more interesting and exciting: "you're doing it on your feet, that's what I like about it … writing a lesson and trying to keep to it, I just couldn't do it" (Roy, II, p. 33).

> I never know what to expect from each kid. Often they'll do the same ones, you know, two or three together, but I don't know whether they're doing number one or number seven. So it keeps me on my toes … it's a bit more interesting for me. (Tom, II, p. 13)

It assisted in teachers' job satisfaction. Rather than be cast in the role of enforcer (Jack, II, p. 8; Sam, FI, p. 17), it was rewarding to witness students' engagement:

> … they were all teaching each other. It was this lovely quiet buzz and all this talk … just continual talk that you really want them to be talking about, like "How does this work?" and "Why do we do this?' and … they're doing it together, they … listen to each other…. Oh, I just love it! It makes me so excited about teaching. It's a good feeling … just that great talk … buzz of a whole group being actively involved, each individual actually participating. (Kate, FI, p. 21)

Also, it helped teacher professional development: "Drive me nuts otherwise.... If you didn't love it, how could you do it? You've got to keep reinventing yourself or progressing" (Tom, FI. p. 30). "Keep trying new things … it's like the more you do, the more you want to do" (Kate, FI, p. 21). Feedback from kids was a powerful aide to teacher reflection and growth:

> … try to get the feedback from the students as much as possible as to whether this was good, whether this was not so good, was there a better way, can they make suggestions? … It makes you more aware of what you're doing … that there is another way of doing things … of the planning that needs to happen if you're going to be successful in the classroom. (Jack, FI, pp. 14 & 21)

At the end of the research all the participating teachers declared their desire to develop their practice so that it became an essential part of themselves and their classroom:

> … just how important it is; only to reinforce, solidify, crystallize in my own mind just how an integral part of my classroom I want it to be (p. 3)…. I just think it's just now become an intrinsic part of the way I want to teach. It's just part of me now, and it's just what I do (pp. 9-10). Attitude, ability, beliefs? Only to strengthen all of them, probably. My attitude towards it is definitely strong … I've got better at it and I sure as hell believe in it. And I think, if I'm honest, I have all along. (Tom, FI, pp. 20-21)

"I've got more confident and once it has become a routine I remember it more. And I'm trying harder" (Joy, FI, p. 11). (Rae, FI, p. 22; Kate, FI, p. 5).

The role of the teacher was not diminished by co-construction, but became perhaps more complex: "It's not denying the teacher's role in it is very, very important, you've got to be quite perceptive and you're managing a lot" (Roy, II, p. 32). It is critical that the teacher does not abrogate their responsibility, has clear intent and is part of any negotiation (Roy, II, p. 25). In thinking from the perspective of the learner, teachers clarified their understanding of the role:

> I think I'd still like the teacher to be the boss most of the time, but I [as student] would like to have some input in terms of how we might do things, or … what types of activities we might be able to choose to do. (Rae, II, p. 11)

> I would love it if a teacher had asked me what context we wanted to learn in but I'm pretty sure as a student … I might not have offered anything…. So I would like my teacher to have quite a few up their sleeve too to say "Well, I've got these ideas. You can pick it. Are any of these interesting?" (Sam, II, p. 19)

> The input I'd like is to the whole subject matter, what I was learning, but I would also expect … that the person in front of me did know how to guide you, have a thorough knowledge of the subject, and could offer me skills, even just develop it. In other words I'd like to set the path or the track, but … there's no way I could help myself all the way through it. (Roy, II, p. 35)

Teachers came to realise that they needed to be willing to experiment and have failures (Tom, II, pp. 15-16), modelling the work which learning might require, rather than being the expert with the answer always at the ready (Sam, II, p. 17). One teacher felt there was a greater focus on the lesson: "What's happening in my room in that 60 minutes and how I'm managing what's happening. How we try to vary the day and have a range of different activities, and involve students on different levels" (Tom, II, p. 15).

One cogent reason to co-construct might be the affirmation of the practice from research projects aiming to raise the achievement of Māori students such as *Te*

Kōtahitanga (Bishop et al., 2003). As reported in 5.3, teachers had a diversity of opinion over the effectiveness of co-construction with various ethnicities. However an encouraging viewpoint concludes:

> Both of my junior classes this year are totally Māori classes. But last year I had a mixed ability mainstream, run of the mill, year nine class with Pākehā, Māori, Asian … whatever in it, and they worked great. I know our theme is improving Māori kids' achievement, but I think we've worked out that what we do for the Māori kids actually works well for everyone. (Tom, II, p. 22)

The benefits of co-construction were substantial and enduring for both the teacher participants and students. They identified many benefits in developing the pedagogy. The following section discusses several important aspects from these.

5.4.2 Discussion: Why co-construct?

This section discusses several important points from this final findings section which explained why teachers and students wished to persevere with co-construction. These include the importance of relationship in pedagogy, the ascribed benefits for students and teachers, the nature of evidence in educational settings, and the overlap with formative assessment.

The importance of relationship as a foundational aspect of teacher/learner interaction was a strong theme in teachers' appraisals of co-construction. This aligns with other literature particularly in relation to culturally responsive teaching (Gay, 2000; Gibbs, 2006; Villegas & Lucas, 2002). The strengths of developing a strong partnership, based on values of mutual respect and cooperation also resonated with students. Co-construction can be viewed as enacting respectful human relationships - taking the classroom closer to the traditional one-to-one interaction of learning (Erickson & Shultz, 1992). Bishop et al.'s *Te Kōtahitanga* research (2003; Bishop, Berryman, Cavanagh et al., 2007; Bishop, Berryman, Powell et al., 2007), like that of Hawk, Cowley, Hill and Sutherland (2002), stresses the importance of a culturally caring relationship with Māori youth in improving their achievement. However, it is important to be wary of stereotyping students by gender, ethnicity or SES. For example, McInerney (2005, p. 596) notes many cross-cultural studies show less variation between

groups that within. Holding a strong awareness of the diversity amongst such categories, their overlap and the ensuing complexity of any student cohort is essential for teachers. Nevertheless, literature addressing diversity, such as Alton-Lee's (2003), also endorses the importance of caring, supportive relationships. And Māori still lag considerably behind non-Māori in achievement right across the board.

The reported benefits attributed to co-construction are considerable, being focused particularly around students' learning: those of improvements in engagement, involvement, participation, ownership, control and therefore better learning. They represent almost a causal response stemming from ideas about what constitutes ownership and responsibility. Engagement is a prerequisite to improved achievement. These findings replicate other research, which showed students said they learnt best when "motivated and engaged with both the purpose and process of learning" (Flutter & Rudduck, 2004, p. 110). (See also Beane, 1997, 2005; Bishop, 2008; Bruner, 1996; Cook, 1992; McCallum et al., 2000.)

The teachers brought their own understandings of being a learner to assist their redefinition of their roles and those of their students. They valued a teacher role which had intent, strong content and pedagogical content knowledge, guidance and support for learners, while developing greater spaces for partnerships with students in their classroom curriculum: "Everyone has expertise to contribute - students, texts and teacher" (Good & Brophy, 2003, p. 413). The need to be able to flexibly vary the extent of student input with individuals, groups and the class, was driven by the uncertainty and the range of student knowledge and performance at any point in time.

Although for several teachers a co-constructive pedagogy required a considerable shift in their beliefs about teaching and learning, at the end of the study the synergy between practice and theory was greater for all participants. The reaffirmation for a couple of past practice provided a revitalizing of their foundational beliefs, and a stimulus for continuing professional growth and development. Others found ways to grow their practice incrementally, and

recognised the significance of their changes over the time of the study. Teachers had moved from using cooperative and group activities as strategies to provide variety from transmission, to a partnership in action where dialogue and students' views had import and were required by shifts in their focus on, and appreciation of, how learning occurs.

A continued strong optimism and affirmation of co-construction, supported by past research (from initial teacher education days) and the current *Te Kōtahitanga* and Te Kauhua projects in particular, was evident. The benefits of pursuing co-construction related to its impact on teacher interest and job satisfaction may stem not only from the reported elements of uncertainty, innovation and flexibility, but also from the need to be wholly present "in the moment" in the classroom as a learner about their students' learning, and a decision-maker about curriculum. Such "on the spot" decision-making (Good & Brophy, 2003, p. 434) tailors teaching to fit the context and is a core feature of the approach.

What counts as evidence in educational settings poses critical long-term issues for educational research. For credibility, the continuing requirement to demonstrate improved student achievement through test scores ignores the narrowness, inaccuracy and selective nature of what they measure. Also, it distances the numerous range of indicators of learning and developing dispositions which teachers use during every lesson to assess their students and evaluate the success of their teaching (their professional judgement). Professional judgement, which rests on the exceptional richness of the observational, epistemological and pedagogical experience, and personal student knowledge that an experienced teacher has, must be more highly valued. The dismissal of their own intuition and experience as being less valid than "hard data" (which is in itself subjective) is problematic. It underpins a society-wide valuing of the objective over the subjective, quantitative over qualitative, and scores over descriptors. However, there are studies that do provide quantitative support for constructivism over traditional instruction in both student achievement and satisfaction (e.g., in mathematics, Battista, 1999; Grouws & Cebulla, 2000; Inch, 2002; Raymond, 1992; and Travis & Lord, 2004).

Many aspects of a co-constructive pedagogy are excellent examples of formative assessment in action (or as often named *assessment for learning*) (Bell & Cowie, 2001; Clarke, 2003, 2005; Clarke, Timperley & Hattie, 2003; Harlen, 2006; Hattie & Timperley, 2007; Sadler, 1989). Clarke et al. (2003) begin their explanation of the strategies of formative assessment with sharing learning intentions with students. Feedback is acknowledged by Hattie (1999) as the most effective way to raise student achievement. The conversations about learning between students, and teacher and students themselves, provide an environment, whether in groups or as a whole class, where the focus is on learning and such feed-up, -back and -forward is the grist of the interchanges. Such feedback is described as "loops" (Agnew & Lodge, 2000). The encouragement and expectation of student initiative, ownership and responsibility for their learning in co-construction mirrors many of the strategies suggested by Clarke et al. (2003). Indeed, Clarke (2005) suggests a constructivist classroom as providing the requisite classroom culture for enriching feedback. However, co-construction is more than this. It potentially invokes greater student input and responsibility for their learning, in their negotiation of its content, method, assessment, reporting and evaluation.

This section has discussed important aspects of co-construction that support the reasons for persevering with the pedagogy such as the importance of relationships and formative assessment. The following section selects points to examine from the findings overall (Chapters 4 and 5).

5.5 Findings Conclusions

This research study set out to describe the understandings, views and responses of several New Zealand secondary teachers (mostly of mathematics) and a sample of their students to a co-constructive pedagogical approach in the current secondary context. The aforementioned findings (Chapters 4 and 5) emerged from the detail of their experience. The following discussion summarises several major points which arise from the study overall namely:

- the distinctive, idiosyncratic and organic nature of each enactment of a co-constructive approach, given shared core characteristics;
- the strength of the disciplines and traditional pedagogies;
- the learning involved for all participants (teachers and students) in any pedagogical innovation;
- the multitude of potential contraints to easy implementation; and
- the many benefits of persisting with co-construction.

The nature of a co-constructive classroom

Given that there is a distinctive, idiosyncratic and organic nature to each enactment of a co-constructive pedagogy, some shared, core characteristics were, however, evident. There may be the use of common strategies across such classrooms (e.g., use of groups, accessing prior learning by brainstorming); similar teacher intent (e.g., efforts to promote student autonomy, involving students in decisions or input into many aspects of their classroom curriculum); and predominating types of interactions (e.g., much use of and acting on formative interactions, listening to students and responding to their questions, and group strategies which required students interacting with each other - teaching and learning). However, there is no recipe - no one size fits all.

The importance of formative assessment interactions as a dominant feature of the approach in action, provides further assurances of benefits to teachers and learners. It *must* enhance learning, given research findings on the power of formative assessment and feedback, such as that of Black and Wiliam (1998), Clarke et al. (2003), Hattie (1999), Hattie and Timperley (2007), and Agnew and Lodge (2000).

Each teacher evolved an individual, idiosyncratic version of co-construction; each teacher developed a personally-constructed understanding and range of strategies

and interactions which they used, altered and added to with input from their students' suggestions and their own reflection. This may vary in substance and emphasis from subject to subject, and the content (knowledge, skills, understandings, competencies) being taught. The images of co-constructive classrooms observed and recalled, were not formulaic.

The strength of the disciplines and traditional pedagogies

In this study the discipline of mathematics and its pedagogical traditions became an issue in the choice of appropriate pedagogy and pedagogical change. In contrast to many researchers and theorists (see earlier listing in discussion 5.1.2), the beliefs about the subject and appropriate pedagogy of some of these students and teachers were very different from what a co-constructive approach might involve. Their view of a very static, content-rich, discrete type of knowledge in the discipline required high levels of teacher expertise and very sequential, direct instruction so coverage of topics was comprehensive. Therefore, to embark on a co-constructive approach was thought by a good number initially as foolhardy, against commonsense, contrary to their experience and understandings of how to teach and learn this subject. Such views exemplify Nuthall's (2001) view of teaching as being predominantly a cultural ritual: shaped by culture and tradition rather than by research evidence.

Such viewpoints conflict to a great degree with much of the research and writing about mathematical pedagogy in the past two decades which dominate with the development of constructivist pedagogies (Begg, 1993; Brophy, 2006; Carr & Ritchie, 1994; Cobb, 1994; Davis et al., 1990; Walshaw, 1996). Such a lack of uptake of innovation is disquieting. In full, the intentions of New Zealand's national curricula, notwithstanding international movements in pedagogy, may not be reaching or being taken up by teachers. However, there should be room for continued debate about and variety in the approaches to subject pedagogy; and change should be supported with robust argument of how it improves learning and teaching.

In recent decades there has been acknowledgment that generic ideas of quality teaching may require some alteration to better fit each discipline (Alton–Lee, 2003; Brophy, 2001c; Codd et al., 2002). Some teachers wanted to have ready-made examples of subject-specific strategies they can transfer readily into their classroom programmes, rather than having to do the often complex tasks of adaptation that may be necessary to make an approach or strategy fit their students, content and context. Such demands may reflect the heavy workload of teachers in another decade of curriculum and qualification change, or of more concern, a desire to be told what to do.

There are alternatives to structuring curriculum around the academic disciplines. The tradition of student-centred curriculum is one paradigm that keeps re-emerging. One of its recent configurations is the integrated or interdisciplinary curriculum (Apple & Beane, 1999; Beane, 1995, 1997, 2005; Hargreaves et al., 2001; Harwood & Nolan, 2002) that works from students' interests and questions about their personal and social worlds. The promotion of curriculum integration as an alternative is a challenge to the separate-subject approach to the curriculum (Beane, 1995). However, the last decade has seen it achieve few gains in New Zealand classrooms especially in secondary schools, despite research-led MOE initiatives (Fraser, 1999; Fraser & Whyte, 1998a. 1998b, 1998c; Harwood & Nolan, 2002; Whyte, 1999). One factor that may have strengthened the hegemony of the disciplines is the *Curriculum Framework's* (MOE, 1993) discipline-aligned learning areas, which are continued in the new New Zealand curriculum (MOE, 2007b).

The learning involved for all participants in any pedagogical change

The learning for students and teachers involved in developing new pedagogical practices in a classroom, like any learning, takes time and develops incrementally. It requires questioning and problematising the habitual; role changes which inevitably invoke discomfort; and a personal conviction of why such pedagogy might be attempted, based on understandings of underpinning learning theory.

The recognition of the critical role that students play in any innovation is clearly signposted by this study. Students already have considerable power in the classroom and can be a contributing, or the determining factor, in the success of an approach. The focus on "learning as a relational journey constructed in and through interaction with others" (Renshaw, 2007, p. 242) requires that teachers explain and discuss changes and innovations with students, and also scaffold their introduction and development.

The use of comparisons between transmission and constructivist paradigms was not always helpful for teachers trying to implement a co-constructive approach. Such contrasts, though common in the literature (Brophy, 2002a; Good & Brophy, 2008; Kinchin, 2004; Renshaw, 2007; Saunders & Goldenberg, 1996), and utilised by certain participants in this study (e.g., "not spoonfeeding"), promote the use of dichotomies which might assist some in clarifying potential strategies and actions, but can also promote confusions. This was exemplified in this study by that over *laissez faire*, the place of any instruction or directives by a teacher, and student input into content as indispensable. The complexity can be over-simplified to formulaic recipes. As Sfard (1998) explains, the acquisition and participation metaphors represent two exclusive theories of learning - but both are needed for a theory of teaching.

Other issues may arise from the numerous varieties of constructivism and versions of constructivist pedagogy. Many models of how to implement the ideas of constructivism feature in educational literature and unfortunately each has a different name and may focus on the use of particular strategies as being fundamental to success: For example, narrative pedagogy (Lauritzen & Jaegar, 1997) with storytelling and student questions; communities of learners (Brown & Campione, 1996) with big ideas, jigsaw, reciprocal teaching, benchmark lessons, and expert groups; and curriculum negotiation (Boomer et. al., 1992) with Cook's four questions. This issue of bewildering labels, of confusion between models and strategies, is complicated further by the range of types of constructivism: some of the teachers may have been working from an unnamed understanding of radical constructivism, others from a sociocultural version. And perhaps, most teachers

had no clear understanding of such learning theories at all, as the absence of such terminology in teacher conversations might imply. Certainly, there seems a need to accompany teacher PD with explanations of the theoretical origins of pedagogical approaches.

Brophy (2006) also suggests there are inadequate illustrations of what are good, moderate and mediocre examples of constructivist teaching. In this study, teachers developed their own distinctions of a range of qualities of co-constructive practice (see 5.2). In moving to implement co-construction, care needs to be taken that it is not lauded as the only possible pedagogy (the crusading view of some enthusiasts), or over-simplified, and that difficulties are acknowledged (Fox, 2001; Good & Brophy, 2008). Any pedagogical approach needs critical analysis and consideration of the context. It needs to take cognisance of the constraints of the environment, the teacher, the students, the social dynamics of a class, differences between students, and students' motivation.

The concepts embodied in the rhetoric such as power, relationships, authority and expertness are extremely complicated and often paradoxical when applied in the context of co-construction. For example, when power is viewed as being able to be shared - *distributed* among students and teacher, rather than the more traditional understanding of the teacher having power *over* the students, this cannot be without some tainting. The sharing of power with students in the senior secondary school is always contaminated with the authority that the teacher has over grades as examiner, and their positioning in discourse as expert. This may have been the reason for Jack's habitual labelling of such attempts as "contrived".

That the teachers developed different perceptions of co-construction is completely predictable if using a constructivist epistemology. It provides "a perspective rather than a prescription" (Driver, 1997, p. 1015). Common elements which emerged between teachers were the development of their own terminology, some form of graduation of usage, quite complex and detailed descriptions, and

acknowledgement of the importance of student participation and quality communication between all parties.

The potential constraints to easy implementation

The potential constraints identified (many of which are common to any pedagogy rather than co-construction in particular), raise questions about teaching practice and innovation, teacher habits and preferences, and the nature of work in the secondary sector where compliance seems highly acclaimed.

The scope of teacher decision-making in secondary schools may be atrophied from the norm of previous decades. Departments and qualification prescriptions seem to decide content. Time pressures converge on the teacher from the institutional directives for coverage and qualification preparation, in competition with learning discourses. The constraints to teachers' work in the classroom in areas such as curriculum content should be shared with students as a matter of course. Such interactions may be uncommon, yet are an essential to the formative dialogue of co-construction.

Though it may seem too obvious and simplistic to deserve focus, the diversity in attitude and understandings of students and teachers emerged in strong detail in this study. This reality can be sidelined and overlooked in the desire to homogenise an approach, to applaud it. However, our tendency as humans to strive for pattern and categories, to simplify the representation of reality, so explanation is simplified must be named and avoided in conclusions.

The importance of a continuing focus on this pedagogical approach

The final theme provides aspirational reasons from students and teachers of the benefits of this pedagogy - reasons to persevere, which are developed in the final chapter. This section discussed points pertinent to findings of this study and the New Zealand secondary context. The following chapter summarises the study as a whole, and having identified its limitations, suggests the implications of it for various audiences.

Chapter Six

Conclusions and Implications

Introduction

The findings of this study reveal the responses, understandings and actions of teachers and students co-constructing, as well as constraints requiring consideration. This final chapter summarises the study and the findings, outlines limitations, and identifies contributions to knowledge. In addition, it considers implications for secondary teachers, secondary students, teacher educators and curriculum policy, and suggests further research.

Summary of study

The study began with my interest in curriculum negotiation, a pedagogy first described by Boomer (1982b) as a "teacher-student partnership". Later, Boomer et al. (1992) explained a conceptualisation of teaching and learning for the 21st century, where students were actively involved with their teacher in the development, learning, assessment and evaluation of their classroom curriculum. My involvement in research about the cumulative impact of the reforms of education in New Zealand (Thrupp et al., 2000), particularly those relating to the impact of the curriculum, assessment and qualifications reforms of the 1990s, raised questions about the extent to which teachers and students in secondary schools could, in the current context, conceivably "negotiate the curriculum". For the purposes of this study the term *co-construction* rather than negotiation was employed, for reasons explained in Chapter 2 earlier in the thesis.

The study involved a small group of secondary mathematics teachers from one school department and one art teacher from the same school, and students from one of their classes engaged in various forms of co-construction over three terms (about eight months). In the subsequent year, four of these teachers attempted co-construction with a new class. The study used predominantly classroom observation, and semi-structured interviews with teachers and students to

investigate the understandings, actions and expectations of the partners in co-construction.

Conclusions

The conclusions that can be drawn from the findings are grouped under the initial research questions.

What did teachers mean, what did they do, and what did they expect, when they attempted to co-construct the classroom curriculum with their students?

The teacher participants initially used similar, shared discourse to describe their understandings of co-construction from their involvement in Te Kauhua and *Te Kōtahitanga* PD (Bishop & Glynn, 1999; Bishop et al., 2003). The general consensus was teachers worked in a partnership sharing power with students to decide the content and process of classroom learning.

However, teacher participants varied considerably in the ease with which they could accept, implement and identify notions of co-construction in their classrooms. There were combined ideological, personal, structural, curricular and interpersonal constraints and struggles as individual teachers produced a co-constructive pedagogy at once comparable, yet idiosyncratic. Common core characteristics of their pedagogy included spontaneity, quality teacher-student communication with a stress on the teacher as listener, active participation by learners and varying qualities ("levels") of practice. However, their affective responses were disparate with variations from desperation to delight at times over the duration of the study.

A rich array of strategies and interactions were observed and described in the study, emanating across all aspects of classroom practice. The pedagogy was characterised as consultative, interactive, organic, responsive and often unpredictable, and dependent to a considerable measure on the students in the class. Planning, learning processes, assessment, evaluation and reporting, pastoral issues and concerns such as rules of conduct, choice of seating, pace of work and time allocation (important to providing an optimal learning environment), were all

at times the focus of the co-construction. Aspects that had potential for greater development included formal planning of content and method, summative assessment, evaluation, reporting and pastoral care.

Formative interactions were extremely important in the pedagogy in action. Dialogue and new discourse patterns were foci. On occasion the roles of teacher and students were transposable as the traditional roles were merged and even interchanged. The students would become initiators, instructors, and facilitators, and teachers, listeners and learners. The potential value of the student in these "teacher" roles was recognised and utilised with more frequency and confidence in classroom interactions. Furthermore, student control of their learning featured in their pursuit of the feed-forward required to "close the gap".

A relational, caring focus emerged as central to the teachers' justification of continuing this pedagogy, despite its challenges. They believed it benefitted students. It seemed to help foster respectful, responsive teacher-student partnerships, and also partnerships between students. Both teachers and students identified enhanced engagement, participation, ownership, autonomy, responsibility and control of learning for students. Teaching was believed to be more exciting because of the dynamic, unpredictable nature of the encounter, the learning, improvisation and innovation involved, and more complex, but satisfying, roles.

What did students mean, what did they do, and what did they expect, when they co-constructed the classroom curriculum with their teachers?

Students generally responded positively to the experiences of a co-constructive approach. They described it as providing some opportunities to have input into the classroom curriculum, some choice in what they learnt and how it was learnt. However, there were some provisos, related predominantly to the suitability of some strategies used in particular subjects and contexts, for example, the use of expert groups in senior mathematics (5.3.1.1). Students described particular practices as helpful. The commonplace accessing of prior learning was recognised as providing them with opportunities for input and a basis from which to build their learning (4.1.1.2). Open ended learning tasks that involved some element of

student choice or determination such as developing content within guidelines were enjoyed because of the relevance, ownership and interest they provided (4.1.1.2). Student control of questioning, content focus and answers assisted their feeling of being in command: having agency in their learning. It meant they could fulfil a range of learning needs from clarification to steering the course of the lesson. Involvement in assessment, evaluation, reporting and classroom environment, likewise opened up further spaces for student contributions and were generally appreciated for the consideration teachers demonstrated in involving them. Although students were able to identify many issues related to group tasks, the overall weighting was towards the positive features of such strategies. These included teaching each other, helping each other learn, and the potentially greater accessibility of an explanation in "peer language".

Students expected a team-like, consultative approach, and they generally valued being involved in this manner. They acknowledged that sharing decision-making and having greater control improved relevance, motivation and responsibility. However, some resistance was detected related to students' past experience and expectations of subjects, pedagogy and classroom roles. A handful of students did not believe mathematics suited a pedagogy that favoured group work and discussion. Their experience to-date was predominantly of teacher-dominated, textbook-dependent, transmissive style pedagogy. They liked being "spoonfed" because they had got used to it and it was comfortable. They were uneasy and did not like the risks involved when they were expected to fulfil their student role in quite different ways, and showed their resistance by voicing disapproval or restricting their class participation.

Further findings

Two further themes emerged from the study: the suitability of different subject disciplines to co-constructive pedagogy and the many constraints that both teachers and students described that impeded co-construction. Strong subject pedagogical traditions and mythologies emerged as initial barriers to co-construction for students and teachers. Perceived variability in subject suitability was linked to subject content and known pedagogical possibilities. Mathematics,

in particular, had enduring traditions, which were seen to preclude co-constructive approaches. These included infrequent usage of group work and discussion, the reliance on textbooks, the rigorous concepts and procedures, the fast tempo of concept introduction, and the lack of relevance to daily life.

Numerous constraints to co-constructive pedagogy in this secondary context were identified. Teacher and student beliefs and preferences about pedagogy, their classroom roles and responsibilities restrained the uptake of co-constructive practices, as did views and practices in the broader context of the department, school, education system and community. Diversity amongst teachers, such as the extent of their subject and pedagogical content knowledge, and traits such as energy, confidence, risk-taking and perseverance, impinged on the success of co-construction. Student diversity in personality, work habits and attitudes, combined with issues related to group strategies, could be problematic. Classes varied in their responses. Teachers were unwilling to depart from their habitual repertoire with new classes until control and a relationship of trust had been established.

The system structures in this secondary school constrained co-construction. Timetables, streaming, faculty requirements, and qualification demands were examples. Curriculum content was tightly prescribed by school departments and NCEA qualifications. Time pressures, which restrained the teacher planning and resource making considered important to co-construction, included complex demands both inside and outside the classroom, co-curricular, management and administrative responsibilities. From my experience similar constraints would feature in other secondary schools.

The preceding summary of the major findings of the study of co-construction reveals generally positive experiences for both sets of participants, but also identifies many aspects that can challenge implementation. The following section notes considerations that contextualise the overall study.

The limitations of the study

Given the small scale of this study, the broad and generalised significance is limited. Nonetheless, it does provide rich, detailed data on some of the processes of co-construction and the relevance of this for teachers and students. This detail will resonate for those who foster these types of interactions in the classroom and the contexts are highly familiar to secondary teachers.

The study was at one site and investigated a group of seven secondary mathematics teachers (and one art teacher) and the students from one of their classes. It was not long enough to tell how much of what the teachers did would become permanent aspects of their practice. A longitudinal study beyond the 18 months of this one would enable examination of the sustainability and durability of the pedagogical approach. Some evidence is provided on how co-construction can change over time and circumstance (e.g., beginning of year compared to later), but more sustained research periods would enable a greater attention to chronology and change.

Working in a co-constructive manner was developed incrementally and sporadically and was indicated by classroom interactions, strategies and discourse, which were usually contrasting to the customary ways these teachers taught. However, because this study did not use test results or other measures of student achievement, it may be considered limited because of the lack of direct links to student learning outcomes. The teachers themselves often required such evidence-based data, feeling their professional judgements inadequate to prove the success of their teaching.

The wider school community, such as parents and caregivers, were not included in the study. Their perspectives on co-construction and its strengths and limitations would have been interesting.

Contributions to knowledge

The investigation undertaken in this study of how some secondary teachers and their students responded to co-construction adds to the previous understandings of

this approach detailed in the literature review. The teachers' attempts to practice and develop a co-constructive approach contribute to areas of knowledge that are detailed below: pedagogical theory and practice, and professional education.

Pedagogical theory and practice

The study builds on research by Boomer et al. (1992) on curriculum negotiation. It provides further examples of how ideas of collaborative classroom practice can transpire. It demonstrates how co-construction features in the daily interactions which comprise the classroom curriculum, which is a "jointly enacted composition that grows and changes as it proceeds" (Boomer, 1982a, p. 150). Even where there are constraints to formal consultation over the content of classroom programmes for reasons such as faculty or qualification prescription, if the bi-directionality of classroom interactions is acknowledged, students have spaces for influence, input and control.

Culture has emerged more strongly in the explanation of learning in the past two decades. The terminology here is updated to reflect this, with the use of "co-construction" (Bishop et al., 2003). Bishop identified co-construction as a core feature of a culturally-responsive pedagogy. However, the challenges participants had (as revealed in 5.2) in understanding co-construction brought into question the wisdom of the way the terminology was used (see Appendix H and Chapters 3, and 5.2). Perhaps if the tool was upended so co-construction became the underpinning intent rather than one interaction at the top of the list, a deeper understanding of what it comprises might eventuate.

Student views, attitudes and responses are often neglected as part of research into curriculum innovation (Brooker & MacDonald, 1999). This study attempted to redress such an omission by including their perspectives. It contests the notion of a uniform student voice. Hyde (1992a, pp. 54-55) found four major reactions to co-construction by her students: thankful and amazed, suspicious, dismayed and contempt. Likewise, a diversity of student perspectives is strongly represented here. The desire for consultation and the perspicacity of certain students is affirmed. However, not all students wanted to take the active student role that co-

construction often required and their resistance impacted on teacher intent and action. Bruner (2006) suggests that variation of teaching and learning approaches across contexts, times, subjects and students, is necessary.

Students provided a perspective which endorsed their belief in the distinctiveness of the disciplines, as they drew on their past experiences of schooling. Unanimously, students believed humanities subjects, such as social studies, art and English, provided many opportunities for student input into content and process, in contrast with mathematics and science. Students' views on such aspects are seldom reported in the existing literature. Their ranking aligns with the views of Mintrop (2004) and Shulman and Sherin (2004) regarding the appropriateness of subjects to social-constructivist pedagogy, and that of students in research by Stodolsky et al. (1991). In contrast, a comprehensive literature (see Chapter 5: 5.1.2) promotes social-constructivist approaches in mathematics, and the teachers and students in this study were able to develop aspects of these.

This study contributes to understandings of the potential opportunities and constraints (Brophy, 2001c, 2002b; Good & Brophy, 2008; Nuthall, 2002) involved in utilising a co-constructive pedagogy particularly in mathematics classrooms in a secondary school in New Zealand. Brophy (2001a) noted that some social constructivist methods were difficult to implement. The teacher needed a depth of subject and pedagogical knowledge so they could respond to the unpredictable, a viewpoint supported by data from this study (see Chapter 5: 5.3.1.2). However, rather than endorsing his concern that progress towards desired understandings might be sidetracked by irrelevance and misconceptions, especially if students have limited prior knowledge, the process seemed to illuminate these areas and ensure teacher attention to them (see Chapter 4 and Chapter 5: 5.3.1.2). Teachers' role requirements (Nuthall, 2002) such as constant monitoring and close listening, were affirmed in this study (see Chapter 4).

In contrast to Stein (2001), most of the mathematics teachers in this study supported and used small group work as a preferred method (see Chapter 4) because the discourse that happens during the activity was thought important to

students' learning. However, they also added cautions (see Chapter 5: 5.3.1.2). Students needed to be prepared for the task, and practise working together. Careful teacher monitoring and scaffolding of the process was required. Such views parallel those of Brophy (2001a), Nuthall (2002), and Sewell and St George (2008), among others.

Co-construction changes power relations in the classroom (Bishop & Glynn, 1999; Bishop et al., 2003; Bishop. Berryman, Cavanagh et al., 2007; Bishop. Berryman, Powell et al., 2007; Boomer et al., 1992). This study provided evidence that demonstrated movement from teacher domination of power, to power-sharing with students (see Chapter 4). The details of the interactions, strategies and discourse patterns used by teachers and students to co-construct during learning were a feature. However, the descriptions need to be seen as additive to those that characterise a more transmissive style classroom, such as teacher direction and instruction, and student compliance. These additions can be seen as examples of changes in the traditional power distribution in the classroom (Bishop, 2003).

Bishop et al.'s (2003) tool is focused on teacher actions and interactions with students: for example, social interaction, access prior learning, give academic feedback or feed-forward, give behavioural feedback or feed-forward (see Appendix H). The detail of the practices identified here aligns well with those named by Bishop. Teachers were able to identify such actions in their practice as co-constructive. However, this study provides further detail of the possibilities for co-construction of a wide range of specific practices and their usage particularly in the context of mathematics (see Chapter 4). Nonetheless, these must not be seen as exhaustive or prescriptive.

The reflective interviews with teachers after their classes helped reveal a number of habitual co-constructive practices in teachers' pedagogy. For instance, accessing students' prior learning by teachers was a universal practice to identify gaps and misunderstandings, source student interests and sometimes involve students in the development of a task's content. The exposure of aspects of their

practice they were unaware of as co-construction was affirming for the teachers, and supports the place of observation and reflection as an aid to pedagogical change.

Students' perceptions, actions and interactions are an important dimension in the partnership of co-construction. It was interesting that students could identify many teacher actions as having a co-constructive intent and were prepared to evaluate their usefulness. In the analysis of classroom practices, this study starts to identify some of the detail of what students do in the co-constructive classroom, both responses and initiatives. Their agency can take many forms including asking questions, provision of contexts pertinent to their lives, choice of work partners, helping and teaching other students, requests for more time on a task, or more subversively, deliberately "going slow" or not working. The existing literature provides few details of such aspects of secondary students' classroom experience.

Negotiation of the content of the curriculum with students is strongly recommended by the literature on co-construction (Beane, 1997, 2005; Bishop & Glynn, 1999; Bishop et al., 2003; Boomer et al., 1992). Cook (1992) used four questions as one template to use to plan units of work with students (see Chapter 2). However, many constraints were identified that worked against an adequate implementation of this approach in the secondary mathematics context. In particular, formal programme planning in this fashion was avoided because of prescription of the annual content by the department, and requirements of NCEA. Nonetheless, this is a moot point and need not be the *modus operandi*. However, certain contexts did emerge as suiting shared content planning such as revision units, subject areas outside the expertise of the teacher, and senior Unit Standards classes. Nevertheless, understandings of how aspects of the classroom content could still be co-constructed more informally were identified in Chapter 4.

Professional education

Klein (1998, 2000, 2001) among others, identifies difficulties in developing and sustaining change in pedagogy. It was anticipated that the teachers in this study

would begin the new year with a co-constructive approach. However, with one exception, their habitual beginning routines, which used a more teacher-directed style, were retained. The priority to establish control and trust temporarily blocked co-construction.

Implications for developing a co-constructive approach

Implications for developing co-constructive approaches in a secondary context are derived from the conclusions and contributions to knowledge stated above for the following education audiences: secondary teachers, secondary students, teacher educators, curriculum and policy makers, and researchers.

Implications for secondary teachers

This research is the one of few, so far as is known, that documents in systematic detail attempts at co-construction in the New Zealand secondary context (see Brown & Nolan, 1989; Harwood & Nolan, 2002; Nolan & McKinnon, 1991). This context is more complicated by institutional structures and traditions, external expectations and accountabilities, than early childhood or primary settings (Boomer et al., 1992; Edwards & Pimpini, 2000). Furthermore, many of the mathematics teachers and students were embarking on an approach which seemed counter to their previous understandings and experiences of the subject. These teachers all progressed in their development of co-construction and had the choice to develop their practice further. Secondary teachers may take encouragement from the detail of the experiences of colleagues and students, their struggles and successes.

The study clarifies core elements of co-construction such as its relational nature, and dependence on dialogue and formative interactions. It contributes another set of descriptions of practice. Some of the excitement and tensions of such teaching in contrast to a predominance of transmission, are explained by descriptions of participant reactions related to the complexity of the process and the nature of interactions.

Teaching with co-constructive intent can be innovative. Practices that exemplify this, where teachers improvised according to the needs of their students' learning, were Tom's use of a continuum to group students and Joy's revision grid (see Chapter 4). The provisional nature of planning is underscored. Teaching emerges as a highly contextual, organic enterprise which combines planned elements with the spontaneous, and sometimes results in uncertain endpoints. In addition, this study reiterates the extremely complex nature of teacher decision-making in the throes of a lesson: the teacher struggles to juggle competing needs of individual students, groups, and the class as a whole (physically, intellectually, emotionally, culturally). Furthermore, subject knowledge, pedagogical possibilities, available resources, requirements and pressures from external discourses such as departments, parents/caregivers, qualification and administrative requirements, impinge on the judgements made in the moment.

Implications for secondary students

Clearly, to ignore students as an important resource in decisions about learning is imprudent. Their perspective deserves acknowledgment and consideration where possible. They can be perceptive critics, able to provide well-reasoned viewpoints, which augment those of their teacher. This can assist the teacher with immediate information about what helps and hinders their learning. Students play an important role in the classroom as learners and potential teachers. This study showed that many students accept the responsibility that comes with sharing greater control over their learning. Therefore, teachers might endeavour to become more comfortable and welcoming of the reciprocity of this partnership, and accepting of mistakes as part of the process.

This study revealed the diversity of student attitudes and reactions in these secondary classrooms. Because of this, the use of pedagogies that address such variation would seem sensible. Student resistance shows their autonomy and their agency- they were not necessarily willing to endure new pedagogies that they felt might endanger their learning especially in a high stakes arena of qualification preparation. They showed and voiced their discomfort at times. These were legitimate views that should not be avoided or glossed over as students (and teachers) grappled with the changes this approach requires. Indeed, such

situations provided opportunities to co-construct a way forward in a particular context in the classroom.

Implications for teacher educators

The findings of this project can assist secondary teacher educators to identify further essential ingredients of a co-constructive pedagogical approach. Consideration of the student perspective which acknowledges the collaborative partnership of learning, could enhance their teaching. Teacher participants sometimes used this idea as an aid to their classroom decision-making. If the focus includes learners, teachers and their interactions, the understanding of the constant learning involved in both roles may crystallise. Learning about pedagogical approaches may usefully be contextualised to a subject domain to improve student teachers' understanding of the possibilities presented. All pedagogy requires reflecting on and reconsidering.

Descriptions to counter the myth that there is a single recipe for "how to teach" are provided. The study describes how a group of teachers moved from the particular rhetoric used to describe and explain principles of ideological agreement in a pedagogical approach, for example "share power with students", to their efforts to implement this pedagogy. It shows the difference and diversity which is normal, but often lost in literature that tries to generalise about a pedagogy. Every teaching situation is social and situated, and therefore unique, organic and creative.

The learning for students and teacher involved in developing new pedagogical practices in a classroom, like any learning, is slow and incremental. A strength of this study is that it attempted to source the viewpoints and reflections of teachers *and* their students about the pedagogy as it was being experienced: it had immediacy. This provided more opportunities for students to remember the particulars of their context and the content and give their views. To learn about what co-construction was like for students can inform the development of the pedagogy. This method is not often used. Some research into student viewpoints has used hypothetical situations portrayed in pictures and core descriptors to ask for students' preferences, pitting transmission against constructivist approaches

(e.g., Kinchin, 2004); or asked a sample of students about their views of learning and teaching (Flutter & Rudduck, 2004; McIntyre et al., 2005). In contrast, this study requested students' perspectives of the pedagogy of the lesson immediately afterwards. This had the benefit of: recency - their memory of the class was fresh; authenticity - as they had experienced the pedagogy rather than having to hypothesise about classroom situations; and expressiveness - they conveyed the oftentimes bluntly phrased emotional impact of learning in this manner. For example, the range covered "you get all excited" and "it's ours" to "when are we going to get back to *real* teaching?" "really stupid … a waste of five days" (5.3.1.1). Their responses, though prefaced by the statement that they, like teachers, did not always remember or analyse what they did, usually identified aspects of their input into the lesson.

Implications for policymakers

The section on pedagogy in the new national New Zealand curriculum (MOE, 2007b, p. 34) affirms many of the underpinning principles of a co-constructive approach. This inquiry may provide descriptions of some of the potential features that enable or constrain the development of same. The investigation highlights diversity, the need for differentiation, and with the current trends in New Zealand towards personalising learning (MOE, 2007a) as in Britain (Leadbetter, 2004), may provide examples of practices to assist this implementation. However, Renshaw's (2007), warning should be heeded. He sees a recent return to learning being framed more strongly by the individualist paradigm, which "foregrounds testing of each student's progress, and public accountability of the performance of schools and teachers" (pp. 241-242). This resonates with the move in the 1990s in New Zealand to view education as an individual benefit (O'Neill, 1996), a discourse that continues.

The justification for involving students in negotiating the curriculum with their teachers has political reasons that arise from the UN Convention on the Rights of the Child. Article 12 says "State Parties shall assure to the child who is capable of forming his or her own views the right to express those views freely in all matters affecting the child, the views of the child being given due weight in accordance with the age and maturity of the child" (1990). Also it has strong democratic

underpinnings (Apple & Beane, 1999; Beane, 1997; 2005; Boomer et al., 1992; Dewey, 1963, 1966; Grundy, 1987; Lester, 1992; Levin, 1998). It puts students at the "enabling centre" of their education. The sharing of power promotes students' engagement, exploration and reflection (Kordalewski, 1999; Onore, 1992).

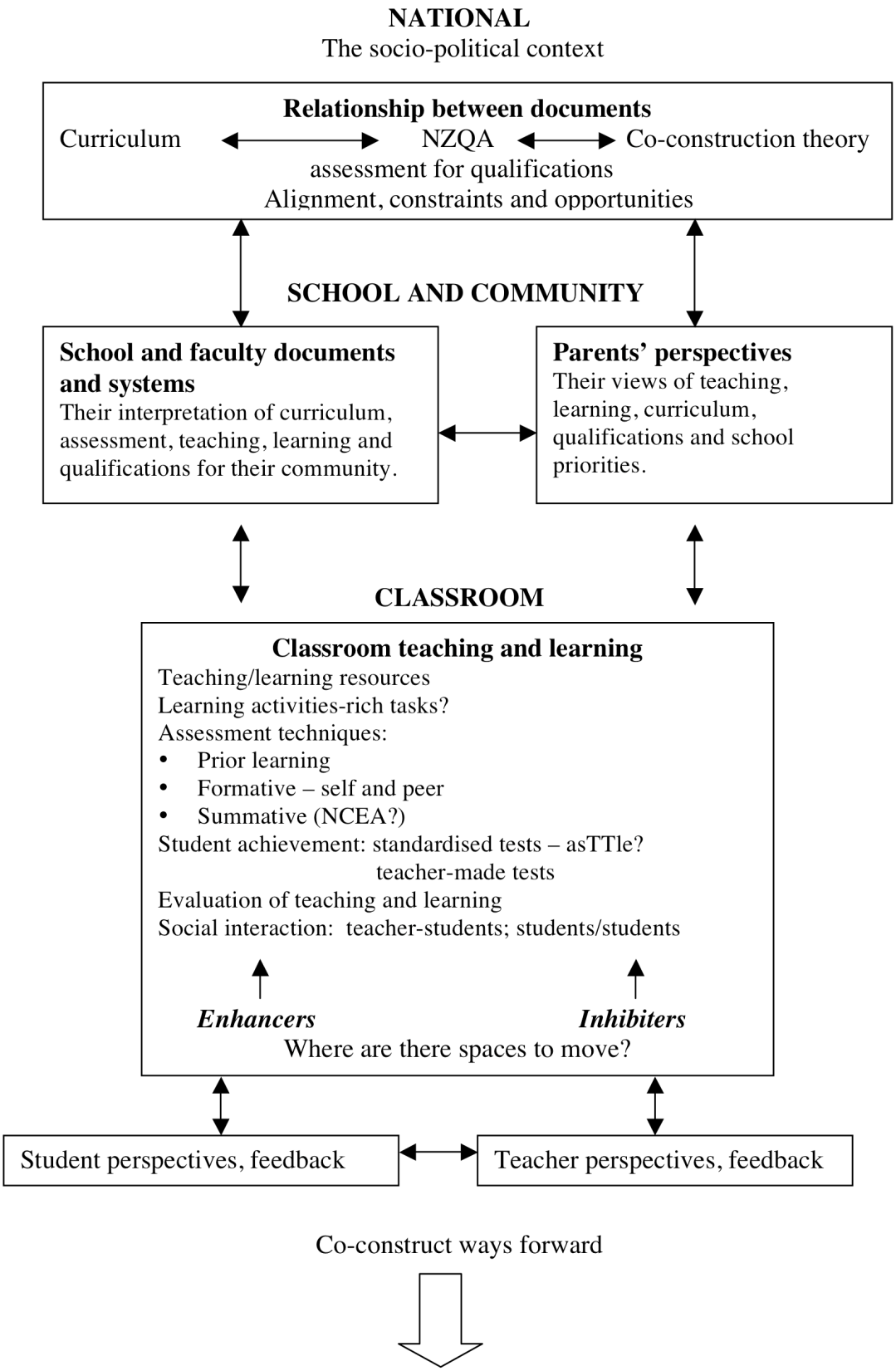
If co-construction is worth pursuing, contingent policies and practices in education must encourage its growth. The previous three subsections on implications show that many factors impinge on teaching. Assessment and qualifications were perceived by the participants in this study as a major constraining impact on pedagogy. The current separation of curriculum statements and assessment and qualification systems at a national level may be a pertinent factor in this. Figure 6.1 provides a model I have developed to show factors that need to be considered by teachers, students, the school community and policymakers from the national to the classroom level. It should be useful for researchers who want to investigate this issue further; in particular, the factors that need to be considered to understand the impacts of assessment and qualifications on pedagogy.

Implications for researchers

There is comparatively little research in secondary classrooms in New Zealand. Further investigation of co-constructive pedagogy on a larger scale, across all areas of learning may help advance understanding of its potential. Case studies of teachers from various contexts may augment the synthesised responses to implementation provided by this study. This research identified particular contexts in mathematics as very suited to a co-constructive approach, for example, revision programmes. New investigations could further pedagogical subject knowledge such as this.

The extent of student involvement anticipated in the rhetoric: in planning, implementing and evaluating classroom curricula, was seldom achieved consistently or to the level envisaged because of a whole range of constraints. A school-wide approach accompanied by research investigation might assist to

Figure 6.1 *A potential model to investigate the impact of national assessment and qualification systems on effective pedagogy*



eliminate some of these difficulties. More intensive investigation of individuals and groups of students might provide more longitudinal data to strengthen and broaden the perspectives provided by students in this study.

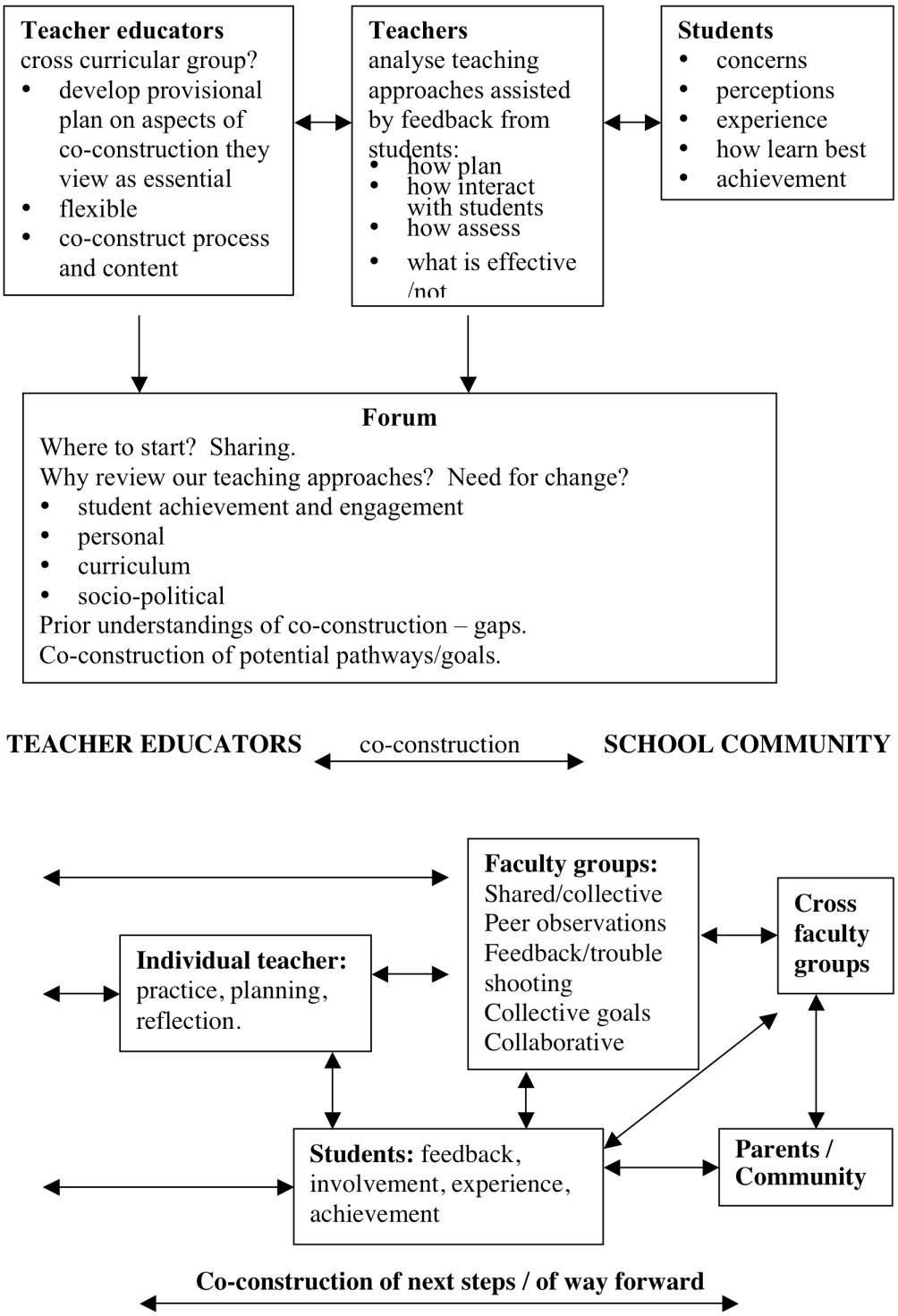
Further questions emerge about the extent of co-constructive practice across all sectors of New Zealand schooling. Are there substantial variations and are these unavoidable? Are the structural constraints of the secondary context able to be countered? Are the acknowledged enhancements in learning environments represented in improved student achievement? Can co-constructive approaches be sustained without burnout for the teachers?

For all the groups mentioned in this section on implications, there is value in understanding the complexity of how co-construction might be developed in schools. The model in Figure 6.2 outlines the steps that could be followed in a PD programme. The model identifies the major participants such as teachers, students and teacher educators. It shows how teachers need to be encouraged to review their teaching approaches and their understanding of co-construction. Also, it shows how the students and school community need to be considered as active agents in co-construction. Finally, researchers could use the model as a tool to monitor the steps in teachers' learning of co-construction, and the factors in the model to describe and explain any given school and classroom setting.

The importance of a continuing focus on this pedagogical approach

The final theme of this study provides aspirational reasons from students and teachers of the benefits of this pedagogy, and gives grounds to persevere with co-construction. The concern about evidence of effectiveness is particularly representative of the current political climate in education where the discourse touts *evidence–based research* with sound supporting reasons. However, as discussed in the final theme, evaluation of pedagogy is difficult (Good & Brophy, 2003). Nuthall (2004) notes the difficulty teachers have in accessing evidence about the learning of their students, mostly having to rely on indirect indicators of student involvement and sampling of a few students, because of the inability of knowing about all students all of the time.

Figure 6.2 *A tentative model of the steps in the development of co-constructive practice*



However, a co-constructive pedagogical approach with its focus on dialogue between teacher and student, and between students, requires the teacher to take opportunities to obtain information about what is going on in students' minds, a necessity in making decisions about how to teach. Learning is as much a matter of social interaction and of language use, as a matter of the mind (Alton-Lee, 2006). Co-construction's focus on the importance of the learning conversation, on students' questions and students' answers, the co-construction of the learning process, the importance of relationship, the social processes of groups, all assist in making more overt the interactions of learning and teaching. This provides the teacher and the learners with a lot more information about what learning is taking place.

The section on effective pedagogy in *The New Zealand Curriculum for English–medium teaching and learning in years 1-13* (MOE, 2007b, p. 34) which has already been mentioned, identifies seven characteristics of teaching approaches that help students learn best. It reads like a social constructivist text. For example "students learn as they engage in shared activities and conversations with other people … by cultivating the class as a learning community … everyone, including the teacher is a learner; learning conversations and learning partnerships are encouraged" (p. 34). It is positive that such rhetoric affirming the effectiveness of co-construction "from extensive well-documented evidence about the kinds of teaching approaches that consistently have a positive impact on student learning" (p. 34) is central to such an important political document. It may help elevate understandings and expectations, and establish and grow this pedagogy in education circles and society-wide. However, the previous curriculum (1993) made similar statements (for example, in the Ministry of Education handbooks *Planning and Assessment in English*, 1997b; *Developing Mathematics Programmes*, *Mathematical Processes*, 1997a) and many teachers do not seem to have acted on the advice given. Bishop, Berryman, Cavanagh et al. (2007) found that teacher transmission of content still dominates New Zealand's secondary school pedagogy.

This study has recorded the efforts of teachers to co-construct with their students, in what was viewed by many as the most difficult discipline, mathematics. The implementation has revealed anticipated and unpredicted responses, but nevertheless shows that with perseverance, the approach can be pursued with demonstrable success. Thus, the potential for extending collaborative partnerships in learning by the use of co-construction in secondary schools is clearly evident.

Appendices

Appendix A: Initial interview guide

Proposed interview questions for teachers:

These questions will be used to guide semi-structured interviews:

Personal Professional Profile (separate sheet)
Details about career as teacher and their philosophy of education, age, qualifications, years teaching: subjects, levels, responsibilities:

• **Have you ever heard of the phrase "co-construction with students"? Y/N**
If yes continue with questions**. If no**- explain what it is then continue with questions

• **Please explain what you understand by co-construction with students?/** student participation in curriculum decision-making?

Do/have you used any other terms to refer to it? Are there differences in meaning?

• **Who/what has contributed to your understanding of co-construction?-** (curriculum documents? PD? teacher education?…

• **What aspects of your classroom curriculum are open to co-construction with students**?
Does this vary? Why? different levels/subjects?

• **How does co-construction occur in the classroom**?
Is it intentional on the teacher's part? In what ways?
Can it be teacher or student initiated? Why is this?

• **Do students co-construct/participate in your classroom curriculum?** What steps have you taken to develop co-construction in your classroom? What do you do?… **Examples please**
- in the planning
- the methods used
- the choice of content and activities
- the assessment
- the evaluation

- the reporting
- other aspects- social, pastoral, behavioural?

• **Why do or might you engage in co-construction? (strengths) egs**

• **What are the effects for students of co-construction?**

• **What are the effects for you?**
Role differences?

• **What might prevent you from co-constructing? (limitations) egs**

• **If you were a student where would you wish to have input into decisions about your learning?**

• **Have any of your students' parents expressed views about their child having input into decisions about their learning?**

• **Have any of your students' parents expressed views about having input into decisions about their child's learning?**

• **Have there been changes in your practice of co-construction over your career?**
Have you always co-constructed? When did you begin?
Describe the changes…

• **With the reforms in management, curriculum and assessment of the last decade, has your practice of co-construction been affected?**
To what might this be attributed?

By what? Curriculum framework, assessment changes- US, NCEA?
Teaching different subjects/ Different students? Experience?
How?

• **What particular issues/concerns/challenges do you identify?**

Personal Professional Profile

To be used with those teachers who opt into the study- probably in the first interview. This section asks you to provide information about your background, your career as teacher:

1. Gender

2. Ethnicity

3. Age group

4. Type of pre-service teacher education you received
   Where?

5. Professional and academic qualifications? Year attained.

6. Length of teaching service and what it has involved (positions, class levels, subjects, rural/city, primary /secondary)

7. How would you describe yourself as a teacher?
   Current position?
   What subjects and class level/s do you teach?
   What extra responsibilities do you have ?

8.Length of teaching service in this school

9.Work experience outside of teaching

Appendix B: Final interview guide

Final Interview Questions

To cover current positions, changes, the influences that have contributed to any changes- growth/decline

Meaning

Where are we at?

Any changes to your views of co-construction? **What is it?**

Do- Teacher

How would you describe to someone new to co-construction what it looks like / feels like to co-construct in the classroom?

What do **you do**?
The **students do**?

What **advice would you give on how to begin** and **go about it**?
On how to **maintain** it?

What are the **essentials?**

How do you set about developing a culture of co-construction? What do you **plan** to do? What **occurs unconsciously/ spontaneously?**

What keeps it in your consciousness? Or is it now unconscious – just part of what you do as a teacher?

Do you co-construct with the **whole class? With groups? With individuals? Can students co-construct with students? examples of each**… sorts of thing would co-construct with individuals, the whole class, groups?

Are you aware of any **differences between your view of what it is and what you do?**

Have you **used any of the strategies** that we shared last July?
What happened? Were they of use?

What issues are there for you when co-constructing?

What is **problematic/ challenging/ frustrating for you** in trying to include more co-construction? **What challenges remain?**

Expectations

Why would you co-construct?

How have your students reacted?

Have students resisted at all? How?
How did you address resistance?

What encourages students to take responsibility in this process?
What seems to **hinder them from becoming involved**/committed?

Have you noticed any **differences between students** in their responses/ participation?

Any patterns emerge re ethnicity? gender? personalities? SES?

Changes
Seems a dynamic process…What has happened over time for you?

Has/have your **attitude/ ability/ beliefs shifted** during the time since the research started?

Any **changes in the way you would approach co-construction**?- feelings, strategies…

What causes **growth/ decline/plateaus?**

What **helps with times of regression**?

What is needed to **maintain the momentum** to change?

Is this **typical of other PD you have done**?

What else has emerged during the research in trying to co-construct?

Has the **Te Kauhua programme assisted you in your uptake** of co-construction? How? In what ways?

Were **the reflection sessions helpful to your development of co-construction**?
How would you improve them?

What might you do differently to set it up at the beginning of another year? How will it impact on next year?

What are you working on currently with your class? Is it a matter of incrementally changing one's practice?

How do you view your classroom curriculum?

the curriculum document?
qualification prescriptions? Any room for negotiation?
flexibility?

Are there aspects to do with the individual teacher that are important to the success of co-construction? e.g., experience, subject knowledge, attitudes, skills, philosophy, beliefs about teaching and learning?

How does a teacher's view of teaching and learning contribute to the success or otherwise of co-construction?

What evidence do you have?

Final Summary

What still needs to be found out?

What are **your current needs**?

Where do you want to go from here re co-construction?

quit?
try new things?
modify? etc

How do you know? (attention, interest, participation, responsibility for learning, achievement..)

Does co-construction improve your teaching?

How do you know?

Has it been **worth the effort**?

Appendix C: Reflective interview guide

Reflection Session with Teacher

Preamble

This is an opportunity for you to reflect on the lesson you have just had in regard to **examples of co-construction**, for **me to give my feedback** about what I thought was happening, and for **students' views to be included** as appropriate.

Teacher's feedback

What did you identify as " co-construction" in your lesson?

Why did you do what you did?

Did you plan for it?

What effect/s were you hoping for?

What effect/s did it have?

Does it tend to be teacher initiated?

My feedback

Affirm/contest teacher's responses

I saw you… language uses, interactions, strategies…

Why did you do this?

What effect/s do you expect?

What effect did it have?

How did/do these strategies promote interactions? learning? classroom culture?

Any student initiated examples? e.g., questions, suggestions

Students' feedback (Incorporate as appropriate)

- effects e.g., makes us think
- about today's examples

Personal Focus? Your next observation… way forward… Refining observations…

Appendix D: Stage Three reflective interview guide

Reflection Session with Teacher 2004

Preamble

This is an opportunity for you to reflect on the start of the year with a new class and what you do to establish co-construction with your students.
As well we will talk about the lesson you have just had in regard to **examples of co-construction**. **I will give my feedback** about what I thought was happening, and there is space for **students' views to be included** if this is appropriate.

Setting up a class to co-construct

Looking back over the last few weeks with your new Y9/10 Class, **did you set out to establish a culture of co-construction** /co-construct with your students?

If **not**, why was this?

If **yes**- continue with the following:

How did you set it up?

What things did you do /to develop this? How did you go about this?

Why did you do what you did?

What were your **expectations**? What were you hoping for?

What effects did it have?

Was/Is there any **resistance**? If so, how was it manifest? How did you deal with this?

Was it **worth the bother**?

Did you use any of the **strategies** we shared last July?

Do you explain to students what you are doing and why and get their feed back on it?
To co-construct with students, are there **things that they need to learn to do**? How important is classroom management to this?

Has it been **easie**r to develop co-construction this year? Have you made **any changes** in what you do to co-construct? Your approach?
or
Have you abandoned it/done less co-construction? Are you more formal and traditional than last year? Why has this happened?

Are there **payoffs** from co-construction?

Drawbacks?

Issues which still need to be dealt with/ pursued?

Teacher's feedback

What did you identify as " co-construction" in your lesson today?

Why did you do what you did?

Did you plan for it?

What effect/s were you hoping for?

What effect/s did it have?

Does it tend to be teacher initiated?

My feedback

Affirm/contest teacher's responses

I saw you… language uses, interactions, strategies…

Why did you do this?

What effect/s do you expect?

What effect did it have?

How did/do these strategies promote interactions? learning? classroom culture?

Any student initiated examples? e.g., questions, suggestions

Students' feedback (Incorporate as appropriate)

-effects e.g. makes us think
- about today's examples

<u>Personal Focus?</u> Your next observation… way forward… Refining observations…

What are your current needs?

Reflection Session with Teacher 2004-Obs 2.

Preamble

This is an opportunity for you to reflect on the start of the year with a new class and what you do to establish co-construction with your students. As well we will talk about the lesson you have just had in regard to **examples of co-construction**. **I will give my feedback** about what I thought was happening, and there is space for **students' views to be included** if this is appropriate.

Setting up a class to co-construct

Looking back over the last few weeks with your new Y9/10 Class, **did you set out to establish a culture of co-construction** /co-construct with your students?
If **not**, why was this?

If **yes**- continue with the following:

How did you set it up?

What things did you do /to develop this? How did you go about this?

Why did you do what you did?

What were your **expectations**? What were you hoping for?

What effects did it have?

Did you use **any** of the **strategies** we shared last July?

Was/Is there any **resistance**? If so, how was it manifest? how did you deal with this?

Do you explain to students what you are doing and why and get their feed back on it?

To co-construct with students, are there **things that they need to learn to do**? How important is classroom management to this?

Has it been **easie**r to develop co-construction this year? Have you made **any changes** in what you do to co-construct? Your approach?

or

NOT- Have you abandoned it/**done less co-construction**? Are you more formal and traditional than last year? **Why has this happened?**

I notice from last year you are still using….(ask for comment-why?) and **are not using**… Why do you think that is?

What **aspects** have you **retained**? **Why?**

What have you **relinquished**? Is this **temporary**?

What is your **goal for 6 weeks time**?

Are there **payoffs** from co-construction?

Drawbacks?

Issues which still need to be dealt with/ pursued? **How might these be addressed?**

Teacher's feedback

What did you identify as co-construction in your lesson today?

Why did you do what you did?

Did you plan for it? spontaneous? student-initiated?

What effect/s were you hoping for?

What effect/s did it have?

Does it tend to be teacher initiated?

My feedback

Affirm/contest teacher's responses

I saw you… language uses, interactions, strategies…

Why did you do this?

What effect/s do you expect?

What effect did it have?

How did/do these strategies promote interactions? learning? classroom culture?

Any student initiated examples? e.g., questions, suggestions

Students' feedback (Incorporate as appropriate)

- effects e.g., makes us think
- about today's examples

<u>Personal Focus?</u> What are your **current needs**? *Schedule last individual interview ASAP and possible times for group sharing/meeting*

Appendix E: Student group interview guide Stage One

Proposed discussion questions for student group.

These questions will be used to guide semi-structured interviews:

Preamble
Introduction of self and explanation of what we will be doing.
Ask students to introduce themselves

This is about the times you have opportunities to have a say/ input into what happens in your classroom. When you work with your teacher to decide what/how/when etc….

1. **What input do you have into decisions about what happens in class? how you learn in class?**

Have you used/heard any **terms/words** for this process? What would you call it? …have a say? …

2. **What examples can you give of being involved in this way?**

Develop as detailed as possible.—

What are the effects for you? Does this help you? (concentrate? learn?)

3. **Were there any instances in today's lesson?**
Develop as detailed as possible.—

What are the effects for you? Does this help you? (concentrate? learn?

4. **How does it happen?**

What does the **teacher do**?

What might **students do**? Questions /suggestions /draw teacher's attention to…

5. **Which aspects of the classroom programme could have student input/ participation?**

(Planning, Methods/activities, Content, Assessing, Evaluation, Reporting
Class environment/rules,Grouping)

6. **Where would you want more input? Into what?…**

Why? Why not?

(Planning, Methods/activities, Content, Assessing, Evaluation, Reporting
Class environment/rules,Grouping)

7. **Are you involved in assessing your work?**

What? How? Details…

8**. Do some teachers involve you more in these types of decisions where you have input??**

Why do you think that is?

9. **What difference does the subject they teach make? Does that make any difference to your input or not ?**
e.g., Is it easier in PE cf English? cf Maths?

10**. What else might make a difference?**

11. What might prevent your teacher from involving you /more?

12. If you were a teacher, what input would you want your students to have into decisions about what goes on in the classroom?

13. What do your parents/ caregivers think of this idea- having some say in what happens in the classroom?

14. How do you learn best?

Appendix F: Student group interview guide Stage Three

Proposed discussion questions for student group.

These questions will be used to guide semi-structured interviews:

Preamble
Introduction of self and explanation of what we will be doing.
Ask students to introduce themselves

This is about what helps you learn best. You might have certain subjects …Are there certain conditions? If you were explaining to your teacher how you would want the classroom to be so that you would learn best…. What would you be suggesting?

1. How do you learn best?

2. Does having opportunities to have a say/ input into what happens in your classroom assist your learning? When you work with your teacher to decide what/how/when etc….

3. What input do you have into decisions about what happens in class? how you learn in class?

Have you used/heard any **terms/words** for this process? What would you call it? …have a say? …

4. What examples can you give of being involved in this way?

Develop as detailed as possible.—

What are the effects for you? Does this help you? …(concentrate? learn?)

5. Which aspects of the classroom programme could have student input/ participation?

(Planning, Methods/activities, Content, Assessing, Evaluation, Reporting
Class environment/rules,Grouping)

6. Where would you want more input? Into what?…

Why? Why not?

(Planning, Methods/activities, Content, Assessing, Evaluation, Reporting
Class environment/rules,Grouping)

7. Are you involved in assessing your own work?

What? How? Details…

8. Do some teachers involve you more in these types of decisions where you have input?

Why do you think that is?

9. What difference does the subject they teach make? Does that make any difference to your input or not ?

e.g., Is it easier in PE cf English? cf Maths?

10. What else might make a difference?

11. What might prevent your teacher from involving you /more?

12. If you were a teacher, what input would you want your students to have into decisions about what goes on in the classroom?

13. What do your parents/ caregivers think of this idea- having some say in what happens in the classroom?

14. Were there any instances in today's lesson?

Develop as detailed as possible.—

What are the effects for you? Does this help you?- …(concentrate? learn

15. How does it happen?

What does the **teacher do**?

What might **students do**? Questions… suggestions… draw teacher's attention to…

Appendix G: Classroom observation schedule

Class. 28/10/03. P.3. 11.30 - 12.30. 1

Ss line up outside.
OK

Ss come in + sit down + get out books.

[redacted] come + put a revision question on board

① .

②

③ [redacted] come + put a revision q for No 3.

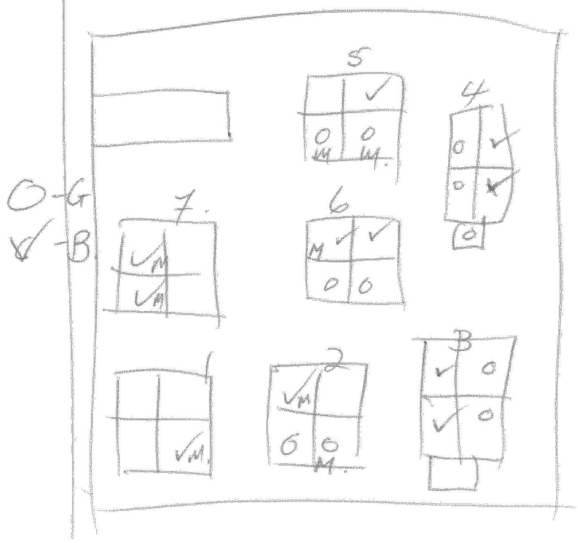
Ss coming up + putting questions on bd.

④ Use your tamagas + start listening

① -1- -12 (3×12)

② +1 - +2 + 4² (16 × 24² + 4³) -36⁸.

I can't even read that.



2

Why couldn't T do her one?

It was too easy.

Look very similar.

[redacted]

Ss. wkg on finding ans to 4

4 a 71°

What do they have to do?

[redacted]

No.

[redacted]

The teacher has to ans. those

I don't think so.

Goodness me what an enormous no.

Who made that one w

[redacted]

[redacted]

I

9

There is a mistake there. Gp 1.

That's your heading – that's cool.

positive + negative –

If that's zero what are those numbers.

Can you think of.
Let's come back here.
What are those 2 numbers called
4 + 6.

Good girl – that's what that is

Gp 2.

How did you get to . . . .

– negative –

Why did you put that here?
Anyone want to correct that?

That's right.

Those 2 numbers here what would you call them?

This one here.

Appendix H: *Te Kōtahitanga* classroom observation tool

Diagram 5.1: Observation Schedule

Classroom Time Sample: School: Teacher Code: Date:

Teacher Codes		Relationships Codes	
S	Social Interaction	W	Whole class
M	Monitoring and Checking	I	Individual
P	Prior Learning/Knowledges	G	Group
FB/FFB	Feedback Behaviour Feed Forward behaviour (either +/-)		
FA/FFA	Feedback Academic/ Feed Forward Academic (either +/-)	**Work Completed as Required by the Teacher**	
C	Co-construction		
I	Instruction	1__2__3__4__5	
O	Other	None Some All	

Observe for 10 seconds then record for 5 seconds

TARGET	1	2	3	4	5	6	7	8	9	10	% E	Work completed	
Student 1 ✓ **engaged** × **not engaged**													
Teacher													
Student 2													
Teacher													
Student 3													
Teacher													
Student 4													
Teacher													
Student 5													
Teacher													

T and S positioning

Subject Area: **Banding of Class:**

Lesson Description	Strategies being implemented
1_____2_____3_____4_____5 **Not Challenging** **Medium** **Challenging** **Cognitive Level for Class**	SRI[17] needed when Co-construction seen. Yes/No

Reminders for Observers Teacher Codes:

	The narratives of experience show us that an effective teacher engages in the following behaviours:
S	establishes a sound, social, caring, respectful relationship with the Māori student and by association with their family.
M	monitors and /or checks that Māori students understand what is expected of them.
P	acknowledges their prior learning or knowledges (including specifically Māori cultural knowledge).
FB/FFB	provides feedback behaviour or feed forward behaviour (+ / -).
FA/FFA	provides feedback academic or feed forward academic (+ / -).
C	co-constructs the learning process, style, content with students. i.e. Co-construction is where the Māori student engages in "conversation" with the teacher, either as a whole-class, group or individual in the decision-making about the learning task/s curriculum content or learning styles that could be used. In effect, such an activity would include all or most of the previous categories. When this occurs a follow-up SRI should be done. E.g. "I noted during the class you … Can you please tell us about this?" etc.

Conventions: a. An external class interruption-stop and begin again when settled. b. Teacher selects 3 students(#1,2,3), researchers 2 (#4,5). c. Start after 10 minute

[17] SRI = Stimulated Recall Interviews. An approach used to engage the observed teacher in theorising about their practice.

Appendix I: Information sheets for teachers

An investigation of co-construction

Dear Colleague

I am a former secondary teacher and counsellor, now working as a teacher educator at the School of Education. I have an abiding interest in adolescents and their learning in schools. For my doctoral research at the University of Waikato, I intend to investigate the co-construction of the classroom curriculum between teachers and students, (that is, the intentional involvement of students in classroom curriculum decision-making). It is often identified as a crucial factor in enhancing learning.

Your principal has agreed to involvement in this research project. I would like to invite you to participate in the study. I wish to find out what teachers and students think about co-construction through interviews with teachers, classroom observations and discussions with students. This study will enable me to find out what the important issues are for these participants, which will provide foci for subsequent research into this process. Feedback from students may highlight for teachers how their students perceive their efforts at co-construction and its effects on their learning.

If you are interested in being involved in this study in your school, **please contact me in any of the following ways:**

•by phone – 07 838 4500, extension 7849 (work) 07 854 1434 (home)
•email - hmansell@ waikato.ac.nz
•or by completing the form below and mailing it to me using the stamped addressed envelope attached.
Many thanks

Heather Mansell

I would like to know more about your proposed study into co-construction. Please contact me in the following way (Please specify phone, email, fax, and if relevant give suggested times).

Name:_____

Subject/s taught:_____

Dear_____ (Teacher)

I am a former secondary teacher and counsellor, now working as a teacher educator at the School of Education. I have an abiding interest in adolescents and their learning in schools. For my doctoral research at the University of Waikato, I intend to investigate the co-construction of the classroom curriculum between teachers and students, (that is, the intentional involvement of students in classroom curriculum decision-making). It is often identified as a crucial factor in enhancing learning.

I would like to invite you to participate in the study. The important issues for participants will provide foci for research into this process. The study will require your completing a questionnaire, taking part in an audiotaped interview, allowing the researcher to observe and audiotape several sessions with your class, and have a discussion with a group of students from the class towards the end of the lesson. This will be followed by an audiotaped reflection session- an opportunity for you to reflect on what occurred with me and have feedback from the perspectives of the students and myself. During and to end the research, audiotaped professional meetings with other teacher participants are planned to share your experiences and make suggestions about where subsequent research should focus.

All information gathered during the study will be kept confidential. Pseudonyms will be used in the research report to protect the identity of the school, teachers and students. The raw data will be accessed only by my supervisors (Professor Clive McGee and Dr Deborah Fraser), Professor Russell Bishop, and myself. Extracts from the data could well be used in publications, research reports and presentations. This study is part of Professor Bishop's research and is developed in tandem with it. You will be consulted on the accuracy of transcripts and the school will be provided with a copy of a preliminary report. You have the right to withdraw from the study within the first two months without explanation.

If you are willing to be involved in this study please complete the attached consent form. If you have any questions or require more information please contact me on (07) 8384500, extension 7849 (or email hmansell@waikato.ac.nz), or either of my supervisors (Professor Clive McGee, 07 838 4500, ext 7711, Dr Deborah Fraser, 07 838 4500, ext 7726).

Yours sincerely

Heather Mansell

Informed consent-teacher

I,……., teacher at ……. School, consent to taking part in a research study with Heather Mansell. I understand that all information, including teachers' names, students' names and the name of the school will be kept confidential. I understand that the study will involve completing a questionnaire, participation in audiotaped interviews, observation and audiotaping of several classes, discussion with a group of students, audiotaped reflection sessions, professional meetings, and a final debriefing with the other teacher participants. I have the right to withdraw from the study within the first two months without explanation.

Signed:…….

Date:……..

Appendix J: Information sheets and consent forms for parents/caregivers and students

Information sheet for parents/caregivers

Department of Professional Studies in Education

9 June 2003

Dear Parent/Caregiver

I was a secondary teacher and counsellor, and now work at the University of Waikato. I have been given permission by your school's Principal and Board of Trustees to research how students and their teacher work out what goes on in the classroom (the "co-construction" of the classroom curriculum). Many people think that it is really important for students to have opportunities to take responsibility for aspects of their learning. I am really interested in the input that students make.

Your child's Art teacher has agreed to take part in this study and I would like to invite your child to take part. I want to find out what teachers and students think about co-construction through interviews with teachers, classroom observations, and discussions with students. Students' views may help teachers learn more about co-construction and its effects on learning.

I will observe several Art lessons, and in the last few minutes talk with a small group of students and tape and take notes of their views.

All information gathered during the study will be kept confidential. Pseudonyms will be used in the research report to protect the identity of the school, teachers and students. The raw data will be accessed only by my supervisors (Professor Clive McGee and Dr Deborah Fraser), Professor Russell Bishop and myself. Extracts from the data could well be used in publications, research reports and presentations. The school will be provided with a copy of a preliminary report.

If you are willing to allow your child to be involved in this study please complete the attached consent form and return it to school in the envelope provided by Friday 13 June. If you do not consent, I will not use any observational data of your child.

If you have any questions or require more information, please contact me on 07 838 4500, extension 7849 (or email hmansell@waikato.ac.nz), or either of my supervisors (Professor Clive McGee, 8384500, ext 7711, Dr Deborah Fraser, 8384500, ext 7726).

Yours sincerely

Heather Mansell (Principal)

Informed Consent- Parent/Caregiver

I……, parent/caregiver of _____ who is a student at School, consent to his/her taking part in a research study with Heather Mansell. I understand that all information, including his/her name, their teacher's name and the name of the school will be kept confidential. I understand that the study will involve the observation of class lessons and possible participation in several informal audiotaped group discussions with other students and the researcher.

Signed:…….

Date:……..

Information sheet for parents/caregivers

Department of Professional Studies in Education

3 June 2003

Dear Parent/Caregiver

I was a secondary teacher and counsellor, and now work at the University of Waikato. I have been given permission by your school's Principal and Board of Trustees to research how students and their teacher work out what goes on in the classroom (the "co-construction" of the classroom curriculum). Many people think that it is really important for students to have opportunities to take responsibility for aspects of their learning. I am really interested in the input that students make.

Your child's Mathematics teacher has agreed to take part in this study and I would like to invite your child to take part. I want to find out what teachers and students think about co-construction through interviews with teachers, classroom observations, and discussions with students. Students' views may help teachers learn more about co-construction and its effects on learning.

I will observe several Mathematics lessons, and in the last few minutes talk with a small group of students and tape and take notes of their views.

All information gathered during the study will be kept confidential. Pseudonyms will be used in the research report to protect the identity of the school, teachers and students. The raw data will be accessed only by my supervisors (Professor Clive McGee and Dr Deborah Fraser), Professor Russell Bishop and myself. Extracts from the data could well be used in publications, research reports and presentations. The school will be provided with a copy of a preliminary report.

If you are willing to allow your child to be involved in this study please complete the attached consent form and return it to school in the envelope provided by Friday 6 June. If you do not consent, I will not use any observational data of your child.

If you have any questions or require more information, please contact me on 07 838 4500, extension 7849 (or email hmansell@waikato.ac.nz), or either of my supervisors (Professor Clive McGee, 8384500, ext 7711, Dr Deborah Fraser, 8384500, ext 7726).

Yours sincerely

Heather Mansell

(Principal)

Informed Consent- Parent/Caregiver

I……., parent/caregiver of_____ who is a student at School, consent to his/her taking part in a research study with Heather Mansell. I understand that all information, including his/her name, their teacher's name and the name of the school will be kept confidential. I understand that the study will involve the observation of class lessons and possible participation in several informal audiotaped group discussions with other students and the researcher.

Signed:…….

Date:……..

Information sheet for student participants

Department of Professional Studies in Education

June 2003

Dear Student

I was a secondary teacher and counsellor, and now work at the University of Waikato. I have been given permission by your school's Principal and Board of Trustees to research how students and their teacher work out what goes on in the classroom (the "co-construction" of the classroom curriculum). I am really interested in the opportunities to have an input that students have.

Your teacher has agreed to take part in this study and I would like to invite you to take part. I want to find out what teachers and students think about co-construction through interviews with teachers, classroom observations, and discussions with students. This study will help me learn what you think, and your views may help your teacher learn more about co-construction and its effects on your learning.

I will come to observe several of your lessons and in the last few minutes tape a discussion with a group of students. I will explain what it is about in more detail the first time we meet as a group.

Your name will not be used when I write about the discussions. Only my supervisors (Professor Clive McGee and Dr Deborah Fraser), Professor Russell Bishop and myself will see the notes.

If you are willing to be involved in this study please complete the attached consent form.

Yours sincerely

Heather Mansell

(Principal)

Informed Consent- Student

I,……., student at School, consent to taking part in a research study with Heather Mansell. I understand that all information, including my name, my teacher's name and the name of the school will be kept confidential. I understand that the study will involve participation in several audiotaped informal group discussions with other students and the researcher.

Signed:…….

Date:……..

Appendix K: Example of coding and categorising

Appendix K.

this is what your going to do, I feel that it's the same person

And you do not notice any difference in their expectations of you?
No

What might put you off co-construction, what might prevent you from doing it? What are its limitations?
Possibly not knowing it fully, like I still do not really feel, like it would be really nice to have some sort of listing of these are all the types of things that you could do that actually co-construction. So in my limited view of co-construction I think that's a limitation in itself, is that I mean I might possibly doing a whole heap of stuff, and that meeting that we sat round and a few things were bantered about about co-construction, I could sort of nod my head and think, oh yes, that makes sense, that's what I am doing so

Understanding of what it is - teacher behaviours.
limited grasp of co-cons.
list of things can do.
not recog. what do yourself.
examples identified c others.
Way of thinking c what they do.
Expanding of ideas/ concept of co-c. behaviours.
understding limited.
of what it is + what could do.
+ what do.

And some of the other people I have spoken to they have given me examples of things and I say that's an example of co-construction, and they haven't sort of slotted it into that concept…
No that's right, so yes that definition of what it is, I think, is a limitation, in a sense of me being able to talk about it, or say yes I am co-constructing, because in actual fact I might be doing something that I have not slotted in there.

Yes,yes the language the terminology
The terminology yes, is a barrier I think in itself, because I do not how fully I can answer everything, because I am still not 100% sure I am right about what co-construction is and I certainly do not, you know if I could see the huge range, I'd imagine that there would be a list, I know it's not, you could never probably have a definitive list, but you could certainly just have this list of, oh yes, I can do that sort of thing, and yes I can do that, yes I can do that.

terminology — barrier.
what is co-const ?
uncertainty c def.

Strategies to employ to help you
Yes sort of activities and things like that, I think you see that is a limitation. I also think like

lists of strategies.
— developing understding in terms of teacher 'moves'
increasing range of behs. — strategies

15

Appendix K.

that the co-construction that T is using of the experts, I think my personal inability to, you know, sort of feel that that will work will be a limitation I think in terms of that area there, until I can see more evidence that, absolute evidence that it actually does work

personal beliefs.

beliefs c certain strategies will light.
need of evidence.
'absolute evidence' = ?

That was what I was trying to remember before, is that you said you talked about letting go, you found it difficult to let go, and have confidence and I guess, in the ability of the kids, when I was asking about the effects for you…
Oh I see what you mean

difficulty of letting go.
having confidence in the kids.

Of co-construction, that would be an area which you would find possibly difficult and probably you would have already explained some things are quite easy but for others no…
Yes I am just coming from the stand point that I still cannot and possibly like I think about the expert concept in terms of how young the students are in terms of what they are having to do and their maturity level and I likened it to when we were on the hui and we went into the practice lessons, and we had some expert, you know different lessons where we became experts, and my feelings then and how I coped with that situation, and then I try and liken it back to those 3rd and 4th formers dealing with abstract concepts, you know, like the concepts I had to deal with as an expert, I could slot into, you know, my prior knowledge, a lot easier, I could visualize things easier, I mean I think my one was you know just to go to describe what a powhiri was or something like that. and I was able to, prior knowledge that I could call upon, I could see quite clearly where it went and it was a lot easier to sort of remember all of the bits and pieces. But I try and link that into maths and I think about how they struggle on basic algebraic things and then to become, you know it's very easy for them to do something wrong and get into a bad habit, and that's where I worry is that in that process that we could end up doing damage, and when I see some of the weak kids… I know that my top kids would be fine as experts, but I would not want to be

variation in what find easy & difficult bet tchers.

Critical evaluation of strategy
↓ "gp".
"Expert relea problems.

own lg. of. ss lg.
after prior lg. maturity level.
powhiri eg. abstract concepts.

difficulty in transferring strategy to maths.
– SS' understanding of algebra.
easy to → bad habits.
doing damage.
wk kids. damage.
vs. top kids.

Appendix K.

NB What

about, the fact that we're giving the students that choice or a feeling of choice at least.

View of learning

methods can use

how to teach them.

imp thg

Or some say. It's interesting that you say underneath, rather than on top. Because in his teacher profile it's up on top.
Yes I always think of an onion, you know that there's layers all the way down the centre and

What's driving it is in the centre?
Yes yes, the most important thing must be in the centre, well I guess call that knowledge or whatever you want, and then coming out of there is hopefully some of the theories of how to teach or how to learn, and then, you know on top of that is all the methods that we can use, I guess.

That's really quite a neat metaphor of that. What would you put in the centre for you?
Pure knowledge, I guess, you know or the knowledge you need to do whatever you want to do, whether it's the kids, or, you know, I think that goes in the centre. But it will change for every person because this person might have, might want knowledge so that they can become a mechanic and this person might want knowledge so that he can become an artist. Yes I'm sure the onion doesn't quite work. (Laughter). It's my theory.

not exact.

Different. knowledge for each person.

Fair enough. What aspects of your classroom curriculum are open to co-construction to the students?
Well that's the big issue for me. I would like to hope most, but I don't know how to do it. I would love to be able to co-construct a context for all our learning, but again I don't know how best we can do that. And sometimes I don't think I have the time to actually put thought in beforehand and I still believe that I need to put the thought in beforehand. For me having that, I know, my worst lessons are my most unplanned lessons and so if I go into a room to co-construct something, well a couple of things I can see happening, one is, if it's a first time, the kids won't know what the hell's this blimmin idiot going on about, which means I expect it to turn to custard, and those ones I don't mind, but even later you know, if the kids, our students have got

Knowledge c how to.
time. beforehand
+ thought.
need to plan still.

preparedness of kids.

6

Appendix L: Probability *Can do* sheet

YEAR 10 - Probability

Name _____ Form _____

	Page	I sign	Partner signs
Achievement: I Can			
• Carry out an experiment			
• Calculate the probabilities from my experiment			
• Follow the instructions to carry out a simulation			
• Complete a tree diagram			
• Use a tree diagram to calculate probabilities			
• Calculate probabilities from simple tables			
Merit: I Can			
• Make predictions from the results of my experiment or simulations			
• Draw a probability tree where the probabilities are the same			
• Complete probability trees and use them to calculate probabilities by multiplying along the branches			
• Calculate probabilities from more complicated tables where there is more than 1 column of data			
Excellence: I Can			
• Evaluate my experiment and say why it was effective or what I could have done better			
• Explain how to carry out a simulation			
• Draw probability trees and find probabilities in practical situations			

I am best at:	My goal for this assessment is:	Assessment result
Before my assessment I need most help / practice with:	Parent/caregiver signs:	Comments:
	Date:	

Appendix M: Co-construction strategies

Strategies for Co-construction

Prior Knowledge

Mindmaps
Rally tables (2)
Some students answer revision questions and others check
Brainstorming (3)
Know/Don't know on T template
Post box
Cooperative games, i.e., Jigsaw
Use "Can-do" sheets to tick off what I know etc.
Student led activity
Negotiation Game
Continuums
Individual brainstorm
Pre-test
Think Pair Share
Roundtable
Whip around
Questionnaire
Use of ARB items
Use of exemplars

Planning

Talking with other staff
Discussing with students what they want to learn "What do we want/ need to find out?"
Students' questions on the topic
Student discussion on order of content
Gain idea of prior knowledge
Asking students "How can we attack this?"
Ask kids for ideas of how they might want to learn some aspects
Negotiation game
Checking learned knowledge "Would you like more time on this?"
10 questions- helps plan what to do next…
Use Venn diagram to display what we know, what we want to know and in the centre get students ideas of how we might go
Get students to prioritise what we all need to know (W), what some groups might (G), what some individuals might (I) - W-G-I
Personal sheets of knowns-unknowns
Post box
Questionnaire

Activities

Practical work to tease out theory
Students to design questions- revision
Group work-leaders who check

Cooperative games
Computer simulation
Puzzle/cut out of solved example
Kids choose activity/game for lesson ender
Choice-W-G-I
Pairs
Jigsaw- expert group
Red Light- green light
Round table
Individual tasks
Plus-Minus Interesting (PMI) as class, group or I
Consider All Factors (CAF) –can follow PMI
Pairs/paraphrase- e.g., How would solve problem and reasons
Huddle
Partners coach/check/observe
Pair Jigsaw
Piggy backing
Quiz questions by students for use with class as revision etc.
Mind maps
Concept maps
Guided discovery
10 or 20 questions
Correcting statements
Barrier activity
Bus stop
Acrostic poems
Fish Bowl
Role play
Add on story
Pyramid- solve in 2s- then share in 4s
Doughnut
Half class debate
Correcting statements

Formative assessment

Listen and respond to kids' questions
Quiz on area of study
Peer review test
Brainstorm prior knowledge
10 questions- student generated
Students model prior tests to practice
Student designed assessment
Cooperative tools i.e. jigsaw expert groups
Group reports
Peer assessment
Self review
Noticing students concerns and giving them feed back and feed forward
Asking students questions to clarify where they are at
Eliciting and answering students' questions
Listening to students and assisting with feedback and feed forward

Summative Assessment

Peer and/or Self assessment- prediction, set goals
Checklist
"Can do" list
Group reports
"Task required" sheets
Class discussion of when to have test
Talking about knowledge to be covered (which)
Generate criteria for unit or test with students
Task required sheets- Hyde
Portfolios- work samples
Reflective journals
Memory test
Assessment tasks
ARB items
Use of exemplars
Checklist

Reporting and Evaluation

Portfolios
Student conference before reports sent out
Student attendance and participation at interview
Rally table- what have I learned? What did I do?
Student input for grades, for criteria- homework, desire to learn etc.
Student work displayed
Evaluation form: groups- of cooperative skills etc: How well I did/we did… Self-learning -What I liked…etc
Whip- feedback about tasks /goal setting
Class formal written evaluation of programme/activities/ teaching/ learning methods etc

Classroom environment

Students' work on display (2)
Class meetings
Let students choose own groups to work in
Rule set-up. Students work with teacher to construct
Co-construct rules- rules up on wall
Individual monitoring of own behaviour
Group monitoring of behaviour- check with reflection

Appendix N.

School:

Subject/Course: **Mathematics: YEAR 9**

Programme Outline 2004

Periods per week: 4

Length of periods:

Teachers:

Term 1	Number 1	Integers	Assessment	Number 1
		Bedmas		
		Powers / Roots		
		Primes / Factors / Multiples		
		Whole Number		
		Basic Skills Test		
	Number 2	Percentages	Assessment	Number 2
		Percentages		
		Fractions and Ratios		
		Fractions		
		Decimals		
Term 2	Algebra	Word Problems	Assessment	Algebra
		Solving Linear Equations		
		Substitution		
		Expanding & Factorising		
		Indices		
		Collecting Like Terms & Simplifying		
	Statistics	Data Interpretation	Assessment	Statistics
		Data Display: Graphs - bar, histo, time-series, stem & leaf, box & whisker, scatter		
		Data Analysis: Mean, Median, Mode, Range		
		Statistical Investigations - Data Collection: sampling		
Term 3	Prob	Theoretical Probability, Probability Trees	Assessment	Prob
		Experimental Probability (Relative Frequency)		
	Measurement	Volume, Practical Activities	Assessment	Measurement
		Area / Surface Area, Volume		
		Perimeter / Area		
		Time, Speed, Scale Drawings		
		Metric Units / Conversions / Reading Scales & Tables		
	Alg 2	Graphs - Plotting Points, Straight Line	Assessment	Alg 2
		Patterns - Linear & simple quadratic		
Term 4	Geometry	Solids - Nets		Geometry
		EXAMS	Assessment	
		Solids - Isometric Drawing		
		Polygons - names, properties		
		Transformations - translation, enlargement, symmetry		
		Transformations - reflection, rotation		
		Parallel Line Rules, Bearings		
		Angle Properties & Rules		
		ELECTIVES		

Appendix N

School:

Subject/Course

Mathematics: Year 10

Programme Outline 2004

Periods per week: 4

Length of periods:

Teachers: Ga Rc Rs Ol Ht

Term	Week	Topic	Activity	Topic
Term 1	1–10	Number	Assessment	Number
Term 2	1–4	Algebra 1	Assessment	Algebra 1
Term 2	5–10	Measurement	Assessment	Measurement
Term 3	1–5	Geometry 1	Assessment	Geometry 1
Term 3	6–9	Statistics	Assessment	Statistics
Term 4	1–2	Prob	Assessment	Prob
Term 4	3–4	Algebra2	Assessment	Algebra2
Term 4	5–7	Geometry 2		Geometry 2
Term 4	8–9			

Week	Topic	Activity
1–2	Bedmas	
3	Integers	
4	Rounding and Standard Form	
5	Squares / roots	
6	Fractions and Ratios	
7	Decimals	
8	Percentages	
9	Word problems	Assessment
10	Indice rules and collecting like terms	
11	Substitution	
1	Expanding	
2	Factorising	
3	Solving equations including rearranging equations	
4	Solving equations	
5	Word problems	Assessment
6	Metric Conversions / Practical measuring	
7	Time / Perimeter / Scale drawings	
8	Area / Composite Areas / Surface Area	
9	Volume	
10	Speed / Reading tables	
1	Limits of accuracy / Word problems	Assessment
2	Angles and reasons	
3	Interior and external angles of polygons (NOT Circle geometry)	
4	Pythagoras / Bearings	
5	Trig = lengths	
6	Trig = angles	Assessment
7	Data collection / Sampling	
8	Data analysis - median, mean, mode, range and quartiles	
9	Data display - bar, stem and leaf, histogram and box and whisker	
1	Time Series graphs and interpretation	Assessment
2	Experimental Probability	
3	Theoretical Probability / Probability trees	Assessment
4	Patterns to rules including simple quadratic patterns	
5	Linear graphs / Parabolas	Assessment
6	Constructions (new at Yr 10)	
7	Transformations (Covered in depth at Yr 9)	
8	EXAM	
9		
	ELECTIVES	

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